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OCTOBER 19, 1935

Railway Age

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In this connection the RAILWAY AGE has designated its November 30, 1935, issue to be a Passenger Traffic and Equipment issue. It will provide facts and figures showing the effect on traffic volume and revenues of innovations in modern equipment, rate policies and merchandising methods.

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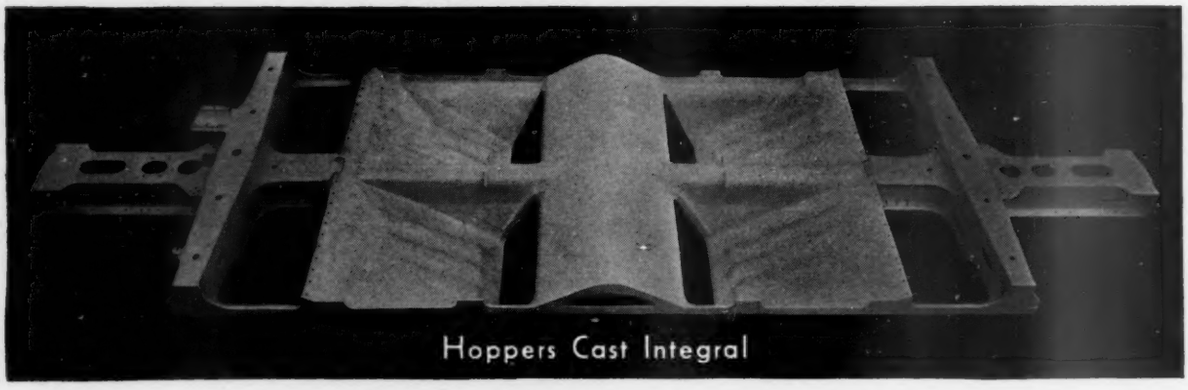

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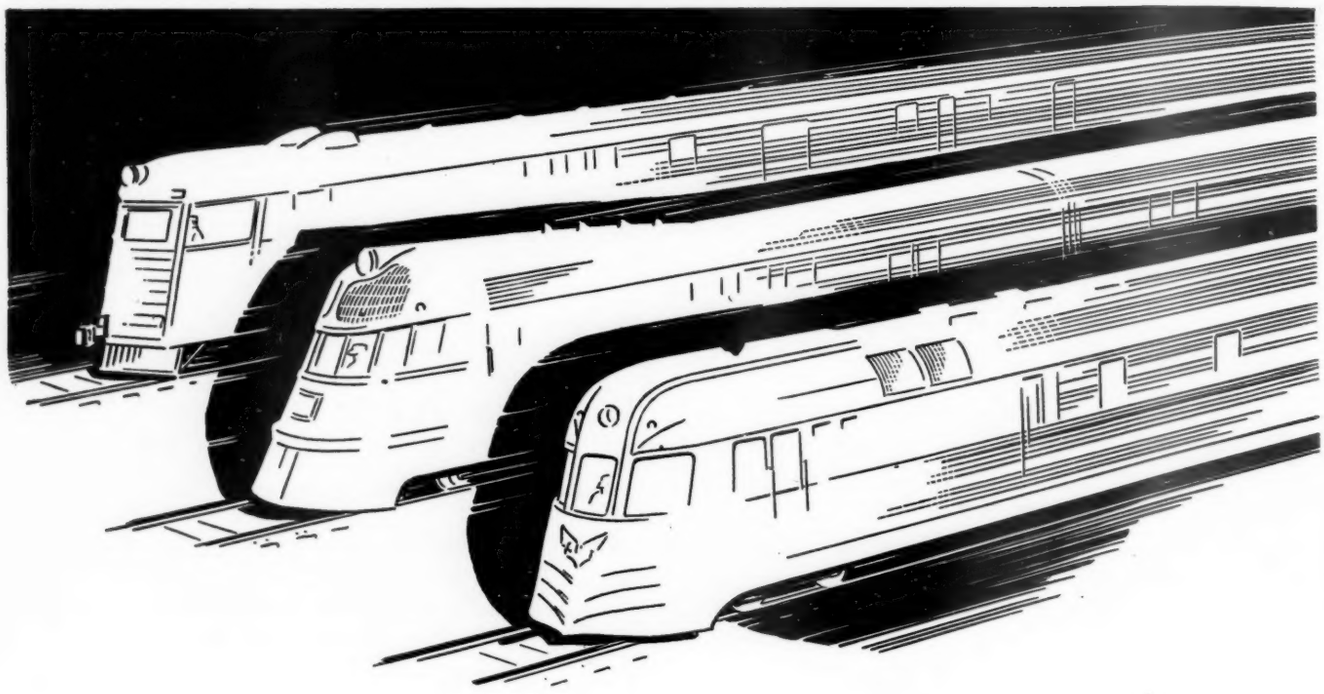

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RAILWAY AGE

More Inconsistencies from the Old Dealers

In an editorial in its issue of October 5 the *Railway Age* said, "They (the railways) are caught between the fire of the New Dealers and the Old Dealers—the former trying, by socialistic measures ostensibly for the public benefit, to prevent increase of production and traffic, and the latter trying, by equally socialistic, but much more selfish, measures to prevent the railways from sharing fairly in the benefits of production and commerce."

Since this editorial was written we have read two expressions that well illustrate the Old Deal attitude toward transportation. One is a statement from the Mississippi Valley Association, and the other an editorial that appeared in the Chicago Tribune on October 11. The Mississippi Valley Association is composed of shippers, most of whom unquestionably are hostile to the New Deal. In its statement it opposes Senate Bill No. 1,632 to regulate water carriers and the Pettengill bill to modify the fourth section of the Interstate Commerce Act. It says that the proposed regulation of water carriers "will restrain that freedom of competition which would regulate rates in the *interest of the shipper* (Italics are ours). * * * Public interest demands the development of transportation facilities which will render efficient service and reduce the freight bill to the producer and consumer so long as the carrier can earn a fair and reasonable return upon his investment. The need of commerce and industry is low cost transportation service."

Old Deal Views from the Mississippi Valley

Nowhere in this statement is there a word or phrase remotely intimating the often demonstrated fact that the reduction of the "freight bill" advocated is not secured by "low cost transportation service" by water, but by high cost water transportation service secured principally at the expense of the taxpayers who provide and maintain the waterways. "There are conditions," it continues, "which make public regulation of rail lines imperative which do not exist in the operation of water lines. * * * It (a railway) does not afford a highway, open to the public; its facilities are limited to its own use. Without regulation, etc., monopolistic control would enable it to charge extortionate and discriminatory rates, and establish rules, regulations and practices without consideration for the public interest. Our waterways are free public highways, maintained as such, as a national policy, for more than a century. Any individual, firm or corporation which has a boat, barge or other equipment is entitled to free access to their use." This constitutes an argument equally frank and hypocritical by business interests for subsidized and unregulated water transportation in competition with unsubsidized and regulated railway transportation.

In the editorial referred to, the Chicago Tribune again criticized the legislation recently passed by Congress for the regulation of motor carriers by highway, and said, "The managements (of the railways) must know that the public is not going to forego the flexibility of the motor vehicle or the convenience of the highways in the interest of uniformity. It is not going to abandon, for the benefit of the railways, specialized water transportation on such navigable lakes or rivers as it has improved." * * * If the railways would make an effort to "shake off the restrictive red tape that has grown up around government regulation * * * the railways are assured from the start of the whole-hearted support of the Chicago Tribune and every other journal truly interested in transportation."

Is the Issue Merely, "Who Gets the Gravy?"

The principal objections made by most business interests and their spokesmen to the New Deal are that its policies involve (1) government regimentation and

coercion of privately-owned business, (2) government use of the taxpayers' money in competition with private investment, and (3) excessive taxation due to such competition with private business and to excessive expenditures for relief. The railroads constitute one of the largest investments of private capital in existence. And yet the government policies advocated by the Old Deal shippers composing the Mississippi Valley Association and the Old Deal Chicago Tribune are, as applied to transportation, exactly the same policies the application of which to other industries the Old Dealers oppose.

In a recent review in the New York Times of James P. Warburg's pamphlet entitled "Hell Bent for Election," John Chamberlain said, "Are Mr. Warburg's allies who are now talking about 'freedom' and 'the Constitution' against all special privilege? Or are they for the special privilege that used the federal machinery in the Coolidge-Hoover days to give disguised subsidies to big business through the mechanism of such things as the tariff, and against the special privilege of Roosevelt 'make-work' politics? Is the issue really 'freedom'? Or is the issue, 'Who gets the gravy?' Before taking a stand we ought to know." We agree with Mr. Chamberlain. Before we go any farther we ought to know whether the issue is one of principle and public interest, or merely "Who gets the gravy?"

Old Deal Complaints About "Taxes"

As has been frequently pointed out in these columns, a large part of the criticism of the "New Deal" comes from automotive manufacturers and allied businesses and advocates of inland waterway development, who are beneficiaries of the colossal expenditures of taxpayers' money and credit on needlessly expensive highways and wasteful waterways. They object to the government's aiding the labor unions to organize their industries and to the expenditure of government money, in competition with some industries, for the relief of unemployment or to boost farm prices, while they not only seek to distract attention from the huge subsidies they are getting by complaining about the "taxes" on gasoline and automotive vehicles, but advocate continuance and enlargement of subsidization of highway and waterway competition with the railways.

Since the "taxes" of which they complain fall hundreds of millions annually short of covering the annual highway bill, they do not constitute taxation in the ordinary sense at all. The attempt to confuse the public on this question is deliberately dishonest, as is the claim that waterway transportation is cheap. And, sad to relate, the attempt to mislead is often successful. Even such a well-informed commentator on economics as the monthly bulletin of the National City Bank views with alarm in its October issue the "taxes paid by the oil companies," which last year averaged "$5.32 for each share of their capital stock, or more than five times their earnings." Obviously it credits the oil industry with "taxes" which represent nothing but its service as a collection agency through which highway users pay a fraction of the cost of highways.

Sincere and Insincere Criticism of New Deal

The insincere critics of the New Deal whom Mr. Chamberlain challenges oppose it, not on principle, but because they believe that by a return to the Old Deal they can continue to receive the favors heaped upon them by previous administrations, and continued by the present Administration, but that parallel favors granted to farmers, organized labor and the unemployed by the present Administration will be withdrawn.

But there are plenty of opponents of the New Deal who are sincere and who have some grasp of economic principles. They realize that recovery is dependent upon increased production, and cannot come from its curtailment. Such persons object to government interference even when it takes the form of doles to business. They know that the major part of the increase in production, which must come if we are to have recovery, must occur in the durable goods industries, where the recession has been greatest. They know also that the buying of durable goods hinges on the prospects which the industries that buy durable goods have of earning reasonable profits, and that the railways are one of the largest of these industries. High taxes, regimentation under labor union dictatorship and subsidies to their competitors are among the threats to the prosperity of the industries which are customers of the durable goods industries that keep them out of the market for durable goods.

Of all industries, the railways have been, still are being and have the prospect of being in future the most injured by subsidization of their competitors. But it is not they alone who are injured by this policy. It has imposed, is still imposing and will continue to impose a huge and entirely wasteful burden upon the general taxpayer. As to regulation, it is obvious that it cannot be applied as at present to the railways, and not be comparably applied to competing carriers, without traffic being diverted from the railways regardless of economic considerations.

Some Political Aspects of Old Deal Policies

The Old Dealers of the Mississippi Valley Association advocate continuance of railway regulation while opposing any regulation of water carriers. The Chicago Tribune says the public is not going to abandon "specialized water transportation on such navigable lakes or rivers as it has improved." But what is its attitude toward the current and future large expenditures that have been, and still are being, promoted principally by Old Deal business interests upon such economically indefensible additional waterway projects as the Missouri and Upper Mississippi river "improvements," the Sag channel in the Chicago district and the Beaver-Mahoning canal in Ohio? The Tribune says

it will support the railways if they will make an effort to "shake off the restrictive red tape that has grown up around government regulation." The *Railway Age* repeatedly has asked it whether it favors certain specific reductions of railway regulation which would be necessary to give the railways the same freedom that the Tribune advocates for their competitors. As long as it refuses to answer such questions, we must continue to regard as insincere its profession of fairness toward the railways.

The matter has its political aspects. The subsidized and unregulated competition to which the railways have been subjected has not merely reduced their earnings. It has deprived many thousands of railway employees of their jobs and threatens the jobs of thousands more. It has helped to reduce the power of the railways to buy equipment, materials and supplies, and thereby not only reduced the business of many manufacturers and coal mine operators, but deprived them of power to employ many thousands of men. Railway operation and buying from other industries formerly afforded employment to at least 2,700,000 men, of whom about 1,400,000 are now out of work because of the present railway situation. It might be well for political opponents of the New Deal, before they espouse Old Deal policies regarding transportation, to consider how these men and their families and friends may decide to vote in 1936. They have shown by their organized and effective support of the recent Motor Carrier legislation that they are very tired of having their jobs destroyed and threatened by Old Deal transportation policies.

It is true that the New Deal has injured the railways, manufacturers from whom they want to buy and employees of both by restricting production and railway traffic, increasing railway operating expenses and curtailing railway buying power. It is also true, on the other hand—and all railway employees know it—that the Roosevelt administration has supported legislation to reduce inequalities in regulation of transportation established and still supported by Old Dealers. There is a complete inconsistency between the opposition of many Old Dealers to certain New Deal policies and their support of precisely similar policies with respect to transportation; and continuance of this inconsistency —which obviously is not dictated by principle, but by selfishness and greed—will not, when exposed, help their opposition to the New Deal.

Critics of New Deal Must Clean House

Criticism of the New Deal on the ground that it has curtailed recovery by its measures which have directly or indirectly retarded production, particularly of durable goods, are sound. They ought to be made over and over again until such anti-social policies are ended. But as long as high tariff reactionaries, waterway advocates, and beneficiaries of wasteful expenditures on highways are prominent among the opponents of the New Deal, opposition to it will be vulnerable and subject to legitimate attack by labor union leaders, socialists, "boondogglers" and other New Deal adherents, as well as by opponents of the New Deal who believe that the railway industry and the railway manufacturing industry and their employees are as much entitled to a Square Deal as any other industries and their employees.

To any sincere believer in private enterprise, its perversion by high tariffs, subsidies and unfairly discriminatory regulation in behalf of rapacious business interests is as repugnant as is the kind of government interference involved in socialistic experimentation. One cannot favor the former and anethematize the latter and gain the confidence and votes of the American people.

Truck Traffic Upturn Greater Than Rail, Is Claim

"The aggregate movement of freight over the nation's railroads and highways has been showing a materially wider gain over the comparable 1934 levels than has been reflected by railroad figures alone, it is demonstrated by an investigation of the recent trend of truck traffic.

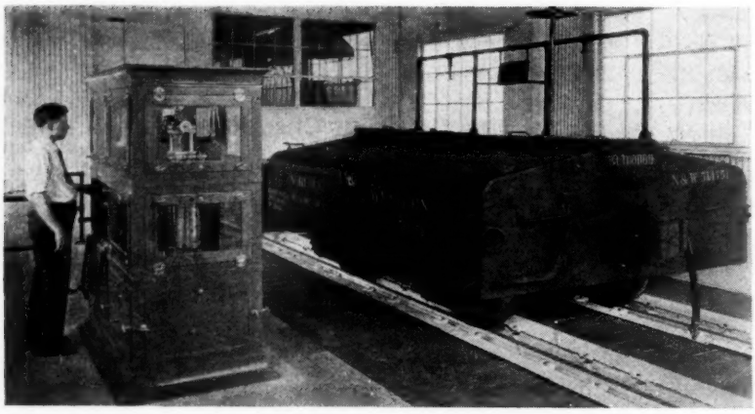
"While railroad traffic during the past four weeks was about 9 per cent above the comparable 1934 level, trucking interests estimate that the highway freight movement during that period showed gains ranging from 10 to 25 per cent over last year. The relatively stronger tone of demand for consumers' goods than for capital goods has been responsible for the sharper increase in truck traffic . . . . "

"Charles E. Cotterill, counsel for a number of trucking organizations, says that the gain in the movement of freight by truck during the past four weeks has been between 20 per cent and 25 per cent for the eastern part of the United States and the Pacific Coast compared with the corresponding period of last year. The pick-up in the East is credited to the consumers' goods demand, while the West Coast pick-up is partly due to heavy government expenditures on the federal projects under way out there.

"The past four weeks have shown a gain of about 15 per cent in the movement of freight by truck in the South compared with 1934, while the increase in the Southwest and Middle West was only 10 per cent. The failure of these sections to do as well as others is attributed to the aftermath of the severe drought . . . . "

—From the Wall Street Journal.

Accurate Track Scales—What Are the Requirements?*



A 100,000-lb. Scale Test Car Being Weight-Tested on Master Track Scale

Adequate attention to installation and maintenance necessary to insure first-class weighing machines

By C. R. Letzkus

Senior Engineer Inspector, Bureau of Standards, United States Department of Agriculture

"INSTALLATION" and "maintenance" of scales are so interrelated that a first-class weighing machine may be realized only when each of these factors receives adequate attention. A scale well installed but not well maintained will not continue to weigh correctly. A scale not well installed but very well maintained will not weigh correctly until the faults of installation have been corrected. Moreover, the high percentage of "revenue" weighings—often as high as 92 per cent of the total—makes it important not only that the weighing machine be adjusted to weigh within the prescribed tolerance, but also that it be adjusted and maintained to weigh with as nearly zero error as is practicable.

Selection of Scale

When selecting a track scale, the following points should be considered:

(a) The maximum loads to be moved over the scale, for weighing or otherwise, with attention to the axle spacing and the load concentration on the axles.

(b) The amount of use to which the scale will be subjected.

(c) Whether or not a dead rail is to be provided, to shunt from the live rails engines and cars not intended for weighing.

(d) The wheel base of cars or other equipment to be weighed.

(e) Whether cars are to be weighed spotted or in motion.

Scales should not be constructed with more than four sections. There are four-section scales with a 110-ft. length of weighing rails, and there are several two-section scales with weighing rails 72 ft. in length.

In my opinion, suspension-bearing scales and rigid-bearing scales are equal in weighing performance. Both types require first-class installation. The rigid-bearing scale has fewer parts to be maintained.

A scale should have sufficient sectional capacity to withstand the impacts of the maximum loads which it is anticipated may be concentrated on a short wheel base and applied to the scale rails. Weighing rails should be of sufficient length for the efficient spotting of cars to be weighed; or, if cars are to be weighed in motion, the rails should be of such length that cars may be on the weighing rails for at least four seconds, to allow sufficient time for the weighman to balance the beam or for the elements of the automatic-recording device to come to rest, while the car is entirely on the scale.

Volume of Traffic

A factor of importance is the volume of traffic to be weighed in comparison with that necessarily switched over the scale, but not weighed. Consideration should be given to possible increases in maintenance, difficulties during periodical inspections and tests of the scale, and hazards to trainmen during the switching of cars. The scale should not be located on the main drilling track unless a large percentage—perhaps more than 60 per cent—of the cars handled are to be weighed; otherwise the scales should be located alongside the drilling track, alongside the ladder track, or on an outer yard track.

In the case of all knife-edge scales, provision should be made for a deadrail track or for a runaround track. The weighing track should be of sufficient length to accommodate cars in solid cuts, thus avoiding interference with adjacent switching. If cars are to be weighed in motion, the scale should be on a gradient, an economical location for this gradient being in the drilling track at the head of the classification yard.

Scale Vault

The scale vault should be constructed to withstand the greatest loads to which it will be subjected. The top of the vault walls or the base of the scale rails should be at least 18 in. above the surrounding tracks. This will permit cars to drift away from the scale after weighing; also, as the surrounding tracks are raised periodically in the course of the maintenance of the yards, it will insure

* Abstracted from a paper presented before the Convention of the American Railway Bridge and Building Association at Chicago on October 16.

that for many years these tracks will not be above the level of the scale deck.

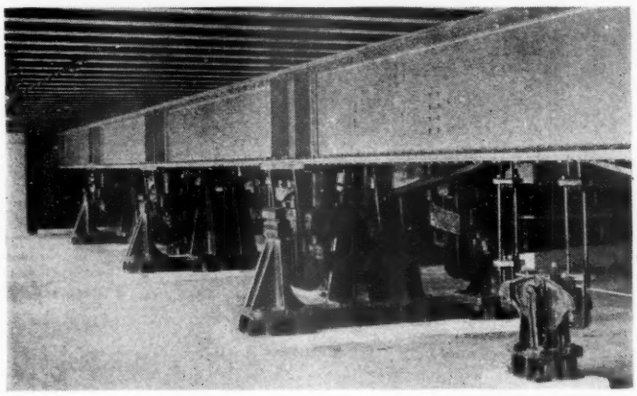
Waterproofing is important in the construction of the foundation. Corrosion is the greatest enemy of the scale mechanism, and if the foundation has been properly waterproofed, seepage of water through the walls of the scale vault will be diminished and maintenance costs will be materially reduced.

The first two ties at each end of the scale bridge and the first two ties on the approach foundations at each end of the scale should be of steel.

Timber decks, composed of laminated planking, are a popular type, but are relatively expensive to maintain; the life of a timber deck may, however, be considerably increased.

An objection to timber decks is that they are constantly in motion as a result of climatic conditions, necessitating frequent attention to prevent interferences with other parts.

Steel decking is used successfully in many parts of the country. It is free from the warping, and the resulting interferences found in the timber deck. Mastic or concrete poured over steel sheets provides a successful type of decking.



View In the Pits of a Modern Track Scale

If the scale pit is shallow and entrances have not, therefore, been provided through the pit neck, deck hatches with removable covers should be provided over each section or between successive sections so that all parts of the scale mechanism may be accessible for inspection and maintenance. Inaccessibility of parts will result in a poorly maintained scale.

Weather guards of the hood type should fit snugly around the pedestal heads and lie loosely on the deck. On scales having rigid decks, and weather guards of the oscillating type, either hinged or cleated, the weather guards should be attached to the live rails. If attached to a timber deck, the weather guards will ordinarily tend to creep toward the live rails, thus requiring frequent attention to prevent interference; however, movement of deck timbers toward the weighing rails may be reduced, if not prevented, by the installation of angle irons along each side of the live rail pedestal heads, positioned one inch from the live parts, and securely bolted to the rigid transverse beams.

Weather guards of the removable type are less expensive to install and maintain than guards of the oscillating type, and have the further advantage that they may be removed readily to afford access to the openings, to provide ventilation for the pit, and to admit light to the pit. This type of guard should be fulcrumed on a projection rising from the rail clamp attached to the rail chair, the short side of the guard resting against the under side of the live-rail head and the longer side extending over the opening in the deck.

Weather guards of the rigid type should be installed only on a steel, concrete, or mastic deck. Even then, this type of guard is not practical where there are heavy snows or frequent accumulations of ice, sand or dirt.

The weightbeam supports should be attached directly to the walls of the neck of the scale vault, and should be free from the walls or floor of the scale house. It is imperative that this part of the installation be rigid so that vertical alinement of connecting rods may be maintained.

Corrosion and interference at the beam affect the weighing performance of a scale more than similar conditions at any other lever. Accordingly, the beam should be protected by a shelter preferably a scale house, but in any event by a beam box mounted separate from the beam supports. The scale house or beam box should be kept locked when the scale is not in use.

The scale inspector, the maintenance men, and the weighmasters should all be familiar with both the construction of the scale and its proper use, and all should be present when the scale is tested.

Testing Equipment

The testing equipment should consist of a test weight car or cars having the following characteristics.:

(a) All-metal construction.
(b) Two-axle construction, with a wheel base not exceeding seven feet.
(c) Load uniformly distributed on the wheels.
(d) No air-operated brakes (unless the rules of the owner road require them). Air brakes are considered to be conducive to variations of the test-car weight.
(e) Roller bearings or some other form of anti-friction journal bearings.
(f) A minimum of ledges, cavities, or projections which may hold dirt, water or other foreign matter.
(g) Minimum surface area.
(h) Smooth and sloped top to insure quick drainage.
(i) Ready accessibility to all parts for inspection and maintenance.
(j) Ruggedness and durability to minimize repairs.
(k) A compartment for sealing material, which should be kept locked or under seal.
(l) No unnecessary equipment.

In the test of a scale, the most efficient results will be

One Type of Hinged Weather Guards for Pedestal Heads

obtained by spotting the test car according to the method followed by the National Bureau of Standards, under which the test load is spotted successively as nearly as practical at the extreme ends of each span, each pair of wheels of the test car being placed over each section in turn. If it is not practicable to follow this method, then the test car should be centered as nearly as may be over each section in turn. To place the car merely at each end of a scale having four or more sections is not a proper test, and in many cases will not accurately disclose the actual condition of the scale.

The scale should be adjusted to the least practicable error. Adjustment to within one-half the prescribed tolerance should be obtained in all cases. (The tolerance for scales in ordinary service is 2 lb. per 1,000 lb. of applied load; for scales in grain-weighing service the tolerance is 1 lb. per 1,000 lb. of applied load.)

When extensive repairs are to be made on the lever system of a scale, the work should be performed in a properly appointed scale repair shop. For a scale in regular service, the scale parts, substructure, and foundations should be cleaned at least twice each month. When a scale is exposed to the elements or is otherwise so located as to be subject to the rapid accumulation of ice or dirt, it should be cleaned as often as circumstances demand.

Lubrication

The scale mechanism and the structural steel should be kept covered with a rust preventive such as paint or heavy oil. The pivots and bearings of the scale levers located in the pit should be well packed with a good grade of grease, and this should be renewed when it becomes hard or cracked. The pivots of the shelf lever and weighbeam should be protected with oil only.

Working clearances of not less than ¾ in. should be maintained around all moving parts of the scale mechanism. The weather guards should be so maintained as to prevent interference.

Live rails and approach rails should be kept firmly anchored to prevent creeping and resultant binds. Both gage and surface should be efficiently maintained at the joints between the approach and live rails; little maintenance of this character will be necessary if the first two ties from the parted ends of the rails are of steel.

An excessively heavy load passing over a scale may cause looseness of the main levers through elongation of the main-lever links or a slight buckling of the weighbridge. Therefore, maintenance men should be alert to discover loose main levers. If the scale has been adjusted with all levers tight, looseness of main levers may be corrected by shimming without impairing the weighing performance of the scale.

All parts of the weighbeam mechanism should be kept oiled, but the oiling should be done sparingly. The main pose pawl spring should be maintained with an effective tension sufficient to snap the pawl into the beam notches. If the beam is equipped with an unusually heavy back balance, the pivot supporting this load should be kept very sharp; otherwise the scale will soon develop an excessive sensibility reciprocal. All connections to the beam should be maintained in proper vertical alinement.

When Scale Is Not in Use

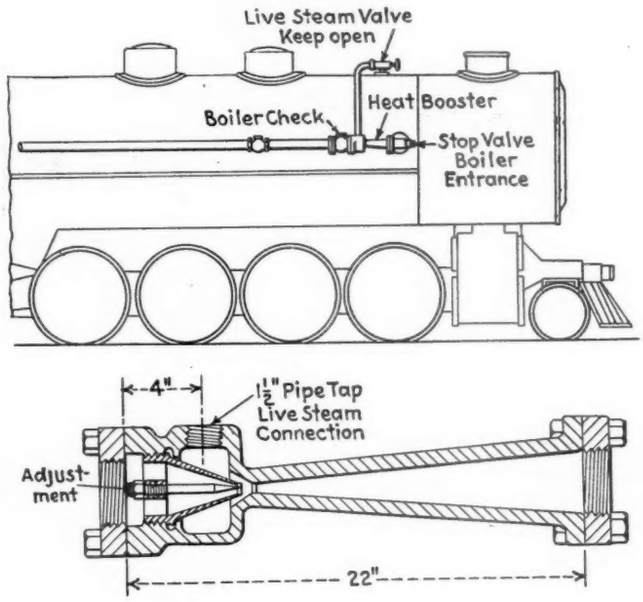
When a scale is not in use, the post should be placed at the highest graduation and the beam should be firmly locked at the trig loop; this will prevent vibration of the beam mechanism and damage to the poise race and the pivots and bearings of the beam.

Cars should not be pushed or pulled over a scale at a high rate of speed; to do so will result in injury to the pivots and derangement of the lever system. Sanding of wheels or placing obstructions under car wheels on the scale may cause serious derangement of the scale mechanism. If an engine is run over a scale on the dead-rail track coupled to a car on the scale-rail track, the rails will be thrust out of alinement and the scale mechanism may be seriously damaged.

Feedwater Heat Booster

A FEEDWATER heat booster, developed and recently placed on the market by the Wilson Engineering Corporation, Chicago, is now in service on several feedwater-heater-equipped locomotives. The purpose of this device is to prevent the possibility of delivering cold water to the boiler under any condition. In addition, it eliminates the necessity of issuing instructions to the engine crew in regard to this possibility.

The temperature of entering feedwater is raised approximately 100 deg. F. by this device, regardless of tank or branch-pipe temperature. It also appears to have solved the difficulty in foaming-water districts where the use of the injector has been found necessary to emulsify the anti-foaming compound used, thus making the feedwater heater continuously available.

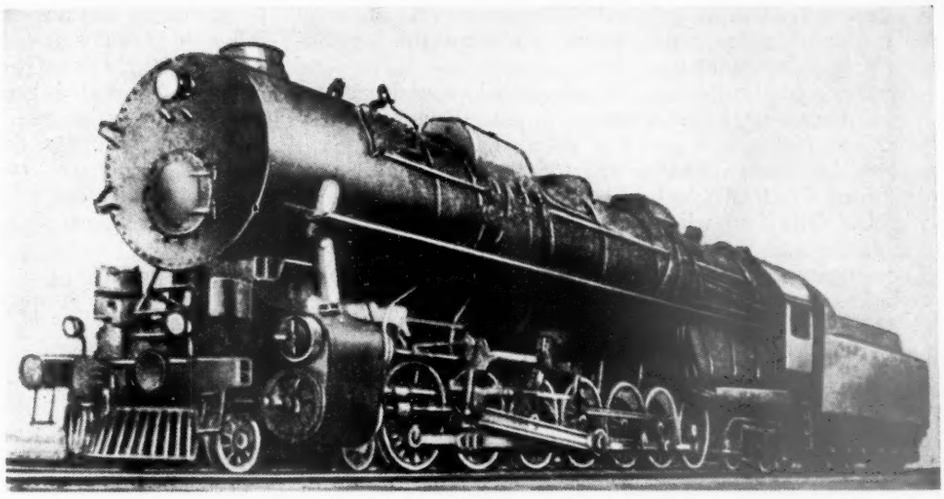


Method of Installing and Sectional View of Feedwater Heat Booster

Tests have shown that the device raises the feedwater temperature approximately 100 deg. F. This temperature is maintained throughout the range of the temperature of the feedwater which is from 50 deg. to 210 deg. F. Thus, if the pump delivery temperature is 200 deg. F., this device raises the temperature to about 300 deg. F. before it enters the boiler. No change in the thermal efficiency, plus or minus, is expected or obtained.

In operation the device primes itself as soon as the feedwater pump starts delivery. The pump is "unloaded" at from 5 lb. to 10 lb. pressure by the kinetic energy of the induced live steam.

The heat booster is installed anywhere in the branch pipe ahead of the line check or, as shown in the illustration between the boiler check and the stop valve. It can be quickly and easily applied in the enginehouse.



The First Non-Articulated Locomotive with a 4-14-4 Wheel Arrangement Weighs 292 Tons Complete with Tender

Russia Builds 4-14-4 Locomotive

Non-articulated heavy freight locomotive designed and built to meet peculiar local conditions

By D. Babenko

IN CONNECTION with the consideration of the proposed adoption of automatic couplers and their substitution for hook and chain coupling on U.S.S.R. rolling stock, it at once becomes apparent that, in order to take full advantage of the increased strength of the automatic couplers, considerably more powerful freight locomotives would be required. The change proposed would make possible the utilization of locomotives exerting a drawbar pull of 60,000 lb. at speed, whereas existing locomotives were limited to a drawbar pull at speed of about 44,000 lb. due to limited strength of the draft gear. It was estimated that a locomotive having the proposed tractive power would require a weight of about 308,000 lb. on the drivers.

Locomotives of similar weight and power were already in service in the United States. These were mainly of the ten-wheel coupled type, many of them 2-10-4 or 4-10-4, and had a driving-axle load of over 60,000 lb. Such locomotives could not be used in Russia, however, without increasing the weight of the rails from an existing 76 lb. per yard to 100 or 120 lb. per yard and also replacing existing bridges. The expense of relaying main lines with heavy rails and other attendant expenses were considered prohibitive.

The use of articulated locomotives, such as the Mallet or the Garratt, was given consideration, but in view of their rather low efficiency and heavy maintenance costs, the adoption of an articulated design was not considered advisable.

The only other alternative was an increase in the number of coupled axles in a locomotive having a single frame. Continuing the investigation, which was made in the spring of 1930, it was found that non-articulated locomotives of the 2-10-0 type were being operated successfully in Germany and a number of the 4-12-2 type in the United States. However, due to the greatly restricted axle loads—44,000 lb. per axle—necessary for operation on 76-lb. rails, a locomotive of the desired power would require the employment of seven coupled axles, or a locomotive of 2-14-2 type. A preliminary design of a two-cylinder, 2-14-4 type locomotive was worked out in the early part of 1931, for which a four-wheel trailing truck was provided, due to the large firebox found necessary.

In addition to restrictions in axle loading, some of the other factors requiring attention in the working out of the design were the following: Ability to pass around existing curves on the U.S.S.R. railroad system, of which curves those of 525-ft. radius were taken as a typical limit; freedom from undue dynamic stresses in the track due to effect of counterbalance or other elements in the locomotive design; no appreciable increase in rail wear caused by wheel flanges; provision of a firebox suitable for burning a low-grade, slow-burning coal; design to avoid unnecessary complications so that maintenance costs could be kept as low as possible.

4-14-4 Type Finally Adopted

After the preliminary design had been gone over and had received tentative approval, it was decided that it would be advisable before starting construction to send representatives to other countries to investigate the results obtained from locomotives having six coupled axles. Accordingly, three engineers were sent to Germany and later to the United States, where they investigated manufacturing and maintenance facilities and inspected and rode on a number of heavy, non-articulated locomotives.

Upon their return the preliminary designs for a 2-14-4 type locomotive were again gone over in light of the information gathered and a modified design was worked out for a locomotive of the 4-14-4 type. After the design had been checked and approved an order for the construction of a sample locomotive was given to the Lugansk Locomotive Works.

The locomotive has now been completed and has made some trial runs before being placed in service. Handling

a train of 1,400 tons, a speed of 25 m.p.h. was obtained on a heavy grade, under which conditions the locomotive developed 3,000 hp.

When cold the locomotive was pulled around a curve of 453-ft. radius. Under steam it passed over a curve of 820-ft. radius at a speed of 28 m.p.h.

This locomotive weighs 458,435 lb. in working condition, of which 308,560 lb. is carried on the 14 driving wheels. The four-wheel-engine truck carries a load of 68,325 lb. and the four-wheel trailing truck, 81,350 lb. The driving wheels are 63 in. in diameter, the two cylinders are 29⅛ in. in diameter, and have a stroke of 31⅞ in., while the boiler pressure carried is 242 lb. per sq. in. The rated tractive force on an 85-per cent basis is consequently 88,250 lb. The light weight of the locomotive is 399,600 lb.

The wheel base of the locomotive is 56 ft. 9⅞ in., and that of the locomotive and tender, 105 ft. 5⅞ in. The driving-wheel base is 32 ft. 11⅝ in. The length of the locomotive between coupler faces is 67 ft. 11⅝ in., and the combined length of the locomotive and tender is 110 ft. 8$^{3}/_{16}$ in.

The tender weighs 275,500 lb. in working order, or 130,040 lb. light and is mounted on two six-wheel trucks of the Buckeye type, of 10 ft. 9⅛ in. wheel base. It has a capacity for 11,620 U. S. gallons of water and 24.2 tons of coal. The length of the tender between coupler faces is 44 ft. 1¼ in. and the wheel base is 31 ft. 6⅛ in.

Many of the features of this unusual locomotive are particularly interesting.

The Boiler

Especially noticeable is the large size of the boiler and the firebox. The boiler is of the straight-top radial-stayed type, the center line being 11 ft. 11¾ in. above the top of the rail. The total length of the boiler is 58 ft. 7⅝ in. and its weight is approximately 132,000 lb.

The firebox is 15 ft. 9 in. long and 8 ft. 2$^{7}/_{16}$ in. wide, which gives a grate area of 129.2 sq. ft. Such a large grate area would not be required were the coal not of such a low grade. The grates are of the shaking type, a mechanical grate shaker operated by either steam or compressed air being provided. The coal is fed by a mechanical stoker. The ash pan is of the hopper type.

A combustion chamber, 8 ft. 2$^{7}/_{16}$ in. long, is provided which increases the firebox volume to 865.2 cu. ft. A brick arch is applied, the arch being carried on four arch tubes of 3½ in. diameter.

There are 138 fire tubes, 2¾ in. outside diameter, and 48 flues, 6¾ in. in diameter. Tubes and flues are 22 ft. 11$^{9}/_{16}$ in. long. This great length accounts for the use of tubes and flues of such large diameter.

The Chussov superheater is of the six-tube type, the outside diameter of the tubes being 1$^{3}/_{16}$ in.

The evaporative heating surface of the boiler has an area of 4,822.7 sq. ft., of which 594.4 sq. ft. is in the firebox and 4,227.3 sq. ft. in the tubes and flues. Adding 1,872.9 sq. ft. superheating surface brings the combined evaporating and superheating surface to 6,695.6 sq. ft. The evaporative capacity of the boiler is estimated to be 73,716 lb. per hour, which corresponds to a potential or boiler horsepower of 3,880.

Assuming a combustion rate of 82 lb. per sq. ft. of grate per hour, the total amount of coal burned would be 10,594 lb. per hour. If one horsepower could be developed for each 2.65 lb. of coal, the total horsepower would be 4,000.

A particularly interesting feature of the boiler construction is the extensive manner in which welding was employed, mainly to keep down the weight, but partly to permit of the use of sheets of readily available sizes. All welded seams are of V shape and are located between lines of staybolts. The firebox sheets, both inside and outside, are welded, being formed of several sheets joined together by welding. The crown sheet and back boiler head are also made of two or more sheets with welded joints.

The boiler is fed by two exhaust-steam injectors having a capacity of 95 to 100 U. S. gallons per minute.

Table of Dimensions and Weights of the Russian 4-14-4 Type Locomotive

Railroad	U.S.S.R. (Russian)
Date built	1934
Builder	Lugansk Locomotive Works
Type of locomotive	4-14-4
Service	Freight
Track gage	5 ft.
Cylinders, diameter and stroke (2)	29⅛ in. by 31⅞ in.
Valve gear, type	Walschaert
Valves, piston type, size	13 in.
Maximum travel	$7^{13}/_{16}$ in.
Weights in working order:	
On drivers	308,560 lb.
On front truck	68,325 lb.
On trailing truck	81,550 lb.
Total engine	458,435 lb.
Tender	275,500 lb.
Wheel bases:	
Driving	32 ft. 11⅝ in.
Total engine	56 ft. 9⅞ in.
Total engine and tender	100 ft. 5⅞ in.
Wheels, diameter outside tires:	
Driving	63 in.
Front truck	$29^{15}/_{16}$ in.
Trailing truck	$41^{5}/_{16}$ in.
Boiler:	
Type	Radial stayed
Steam pressure	242 lb.
Fuel	Low grade coal
Firebox, length and width (grate)	189 in. by $98^{7}/_{16}$ in.
Arch tubes, number and diameter	4—3½ in.
Combustion chamber length	$98^{7}/_{16}$ in
Tubes, number and diameter	138—2¾ in.
Flues, number and diameter	48—6¾ in.
Length over tube sheets	22 ft. $11^{9}/_{16}$ in.
Firebox volume	865.21 cu.ft.
Grate type	Shaking
Grate area	129.2 sq.ft.
Heating surfaces:	
Firebox and combustion chamber	543.2 sq.ft.
Arch tubes	52.2 sq.ft.
Firebox, total	595.4 sq.ft.
Tubes	1,942.1 sq.ft.
Flues	2,285.2 sq.ft.
Tubes and flues	4,227.3 sq.ft.
Total evaporative	4,822.7 sq.ft.
Superheating	1,872.9 sq.ft.
Comb. evaporative and superheating	6,695.6 sq.ft.
Special equipment:	
Brick arch	Yes
Superheater	Chussov
Exhaust steam injectors	2
Stoker	Yes
Booster	No
Tender:	
Water capacity	11,620 gal.
Fuel capacity	24.2 tons
Trucks	6-wheel
General data estimated:	
Rated tractive force, 85 per cent	88,250
Boiler horsepower (Cook)	3,880
Speed at 1,000 ft. piston speed	35.3
Piston speed (ft. per min.) at 10 m.p.h.	283.5
Weight on drivers ÷ tractive force	3.5

Two Friedman live-steam injectors, having a capacity of 45 to 48 U. S. gallons per minute are also provided. Two blow-off cocks are applied on each side of the firebox.

Frames and Running Gear

The frames are cast steel, being the first ones made at the Lugansk Locomotive Works. The thickness or width of the frames is 5½ in.

One of the most difficult of the problems which the design of this locomotive presented was the provision for safely passing around sharp curves at considerable speed and the avoidance of heavy side thrusts and side wear of the rails due to the long wheel base as to the use of seven coupled axles. As will be noted from the illustration of the locomotive, the cylinders are coupled to the fourth pair of drivers.

The third, fourth and fifth pairs of drivers have bald

tires 6⅞ in. wide. The first and second pairs of drivers are arranged to have a lateral motion of 1 1/16 in. each side of the center. No lateral motion is provided for on the sixth pair of drivers, but the seventh pair has provision for 1⅜ in. lateral motion each side of the center. The first truck is designed for 5 11/16 in. lateral motion to the right and left and the trailing truck with 1⅜ in. lateral motion. The lateral motion of the driving wheels is provided for by clearance between driving boxes and hub liners. A lateral-motion device with equalizer spring suspension is provided on the rear axle.

The driving boxes are cast steel with bronze crown brasses and the usual cellars. Lubrication is by packing from the bottom and wick lubrication from a top reservoir.

Spring rigging follows the usual American practice—semi-elliptic springs and equalizers located between the upper and lower bars of the frame. The springs are placed on top of the driving boxes, except on the sixth and seventh axles where it was necessary to use underhung springs due to the presence of the firebox.

Three-point suspension is provided by dividing the spring rigging into three groups. The first group includes the springs and equalizers—on both sides of the locomotive—of the front truck and the first, second, third and fourth axles. The other two groups are made up of the springs and equalizers on the right- and left-hand sides of the locomotive for the fifth, sixth and seventh axles and for the trailing truck.

Main and Side Rods

The design of the rods and motion work presented another interesting problem. As previously stated, the main rods are connected to the crank pins on the fourth pair of drivers. The main rods are 13 ft. 1 9/16 in. long. Despite their great length the distance between the center of the cylinders and the fourth axle is so great that the piston rods are 13 ft. 1 9/16 in. long. To keep down the reciprocating weights and to make unnecessary the employment of piston rods of abnormal diameter, resort was had to a secondary supporting crosshead located midway between the cylinder and the main crosshead. The main crosshead is of the multiple-ledge type developed on the Pennsylvania Railroad.

A tandem main rod serves to connect the fourth to the fifth pair of drivers. The eccentric crank for the Walschaert valve motion is placed on this crank pin. The distance from the eccentric crank to the reverse link was so great that the eccentric rod was divided and an intermediate supporting rocker arm was introduced. Extension rods are used to support the main cylinder pistons and also the piston valves.

In the side rods connecting the first and second pairs of wheels and also the sixth and seventh pairs universal joints with vertical and horizontal pins are provided to permit the allowed lateral motion. The side-rod crankpin bearings on the first, second, sixth and seventh pairs of wheels are of the ball type. All rods are fitted with floating bushings and are arranged for grease lubrication.

Many Other Details Are Interesting

Piston valves are 13 in. in diameter and have a maximum travel of 7 13/16 in. A power reverse gear is fitted.

There are two large sand boxes with 14 pneumatic sanders for supplying sand to the front side of all driving wheels.

A multiple throttle valve with six valves and one pilot valve is installed. There is a stop valve in the dome.

Air brakes are provided, air being supplied by two cross-compound air compressors located on the front deck ahead of the cylinders. Driver brakes are of the Kasantzeff design with brake shoes on the front side of all driving wheels, except those on the front and rear axles where brake shoes are omitted on account of the great amount of lateral motion. Clasp brakes are used on the six-wheel tender.

Notwithstanding the heavy weight of the moving parts (main rod 1,610 lb.; piston, piston rod and crosshead 2,485 lb.) and the high running speed of 43.5 m.p.h. anticipated for the locomotive, it was possible to counterbalance all the rotating masses and the necessary part of the reciprocating parts.

The weights and leading dimensions are given in an accompanying table.

Fire Protection Association Holds Meeting at Baltimore

ANOTHER new ten-year low in fire losses on railroads of the United States was recorded for 1934 in the report presented by the committee on statistics of the Railway Fire Protection Association at the latter's annual meeting which was held at Baltimore, Md., on October 15 and 16. The 1934 figure—$4,156,890—is the estimated loss on R. F. P. A. member roads operating 262,169 miles of line, and is computed from data received from 66 reporting roads operating 231,311 miles of line. It compares with a 1933 figure of $4,243,534 and with $5,104,430 in 1932; the average estimated annual loss for the ten-year period, 1925-1934, is given in the report as $6,304,943.

W. F. Hickey, R. F. P. A. president and superintendent of insurance of the New York, New Haven & Hartford, presided at the sessions which he described as being "more in the nature of a discussion of problems and remedies and experiences, as it is felt that more good comes from meetings where there is full and free discussion than from those involving close adherence to prepared papers and limiting discussions to particular subjects presented in such papers." This, in general, was the nature of the meeting, although there were presented brief reports by chairmen of several of the association's standing committees and addresses by Chief Howard Travers of the Baltimore City Fire Department, and by V. B. Willoughby, mechanical engineer of the American Car & Foundry Company.

Action on accepting the National Fire Protection Association's invitation to become the Railroad Section of that organization was deferred for still another year, pending the outcome of the current inquiry of the Association of American Railroads into the status of railway fire protection activities.

Adopting the report of its nominating committee the association re-elected Mr. Hickey to the presidency which he has held since 1931. W. A. Radspinner, superintendent of fire prevention of the Chesapeake & Ohio, was elected vice-president, and P. A. Bissell, of the Maine Central, secretary-treasurer. This latter position had been held since 1918 by R. R. Hackett, superintendent of insurance of the Baltimore & Ohio, who asked to be relieved but who remains on the executive committee to complete the unexpired term of the Vice-President-Elect Radspinner, who now shifts to an ex-officio membership.

Mr. Hickey in his opening address referred to difficulties which the association has encountered during depression years, but pointed out that, despite such dif-

ficulties, "the R. F. P. A. is entirely solvent and we have carried on during the long depression although we have lost a number of members; but as compared to other organizations we have been much more fortunate." Citing recent improvements in carloadings and in passenger business as signs of better times, Mr. Hickey expressed his belief that, with the improvement in economic conditions, "there is bound to be an improvement in affairs of the Railway Fire Protection Association."

The president also reminded the members of new editions of specifications and revised regulations which have been issued on several subjects by the National Fire Protection Association and the National Board of Fire Underwriters, and suggested that copies of these should be obtained and carefully followed.

Chief Travers, speaking on "Co-operation of Railroads with City Fire Departments," declared that the Baltimore department has always received "100 per cent co-operation" from the railroads. He cited in this connection the instance wherein his men were invited to the Pennsylvania's instruction classes when that road was electrified in the Baltimore area. The speaker paid tribute to the R. F. P. A., and specifically to its hand book, as aids to city fire departments, holding that education and the promotion of standard practice have been of great value in reducing fire hazards.

Mr. Willoughby's address—an outline of recent developments in the equipment field—emphasized "important features in which the new types of trains are superior to anything that may or can be done on revamping old existing car equipment." He declared at the outset, however, against one recent equipment development—the articulated train, which he does not believe in for steam railway service. Following his address Mr. Willoughby presented an illustrated talk on structural details of the Baltimore & Ohio's "Royal Blue," the Gulf Mobile & Northern's "Rebel" and a "railbus" in service on the Norfolk Southern.

Statistical Committee Report

The report of the statistical committee was prepared by Chairman J. E. Frazer, general fire protection agent of the Boston & Maine, in whose absence it was presented at the meeting by W. C. Neely. For 1934 the 66 reporting railroads suffered fire losses totaling $3,667,609 as compared with 1933 losses totaling $3,744,949 on 68 reporting roads. The total number of fires reported increased from 5,319 in 1933 to 5,543 in 1934, and the average number of fires per road from 78.2 to 84. Of 1934's 5,543 reported fires, 4,825 involved a loss of less than $5,000 each.

As in the previous year trespassers were in 1934 responsible for greater fire losses than those attributed to any other single causes. The total 1934 loss so assigned was $390,372 as compared with $649,448 in 1933. The 1928-1934 summary included with the report shows that, during this five-year period, trespassers have been assigned responsibility for 6,861 fires with losses totaling $3,351,976. Fires attributed to "exposure," causing 1934 losses of $331,403, were second on that year's list of causes but first in the five-year totals with losses of $3,629,471. Fire damage attributed to unknown causes was reported for 1934 at $960,893 while miscellaneous losses not separately classified totaled $145,826. Other major causes, together with respective 1934 losses, are as follows: Smoking and matches, $322,300; wrecks, $202,237; electric power and motors, $144,807; sparks or hot coals from locomotive, $121,131; improper construction, installation and maintenance of stoves, $92,279.

In commenting on the statistical committee's report President Hickey pointed out that the national trend of fire losses has been downward in recent years and thus the railroad record is not unique. He added, however, that the downward trend on the railways started first. W. F. Steffens chief fire protection engineer of the New York Central System, thought that with the exercise of greater diligence many losses attributed to "unknown" causes could be assigned to definite categories. He commented also on other features of the report which he called "a great piece of work" and urged that the members should extend greater co-operation to the committee by improving the reporting methods on their respective railroads.

Other Committee Reports

Responding to the call for a report from the committee on bridges and trestles, the chairman, deWitt Rapalje of the Raritan River Railroad, stated that the committee in 1920 brought in "what we thought was a final report." The bridge and trestle fire loss, he added, does not bulk large in the total but it will always be important because such structures are vulnerable points. He therefore urged, as the most profitable procedure, an informal discussion of experiences. This discussion, opened by Mr. Steffens, turned to comment on fire hazards in wood-preservatives. Mr. Steffens urged the necessity of carefully selecting materials used for the treatment of timber in order that the fire hazard in the lumber may not be increased by the preservative. Mr. Radspinner pointed out that railroads are in a position to specify preservatives, adding that it was up to the R.F.P.A. to develop non-hazard-increasing formulas.

The report of the committee on natural gas and gasoline pipe lines of which Mr. Steffens is chairman stimulated considerable discussion on specifications which should be enforced when such lines are laid along railroad rights-of-way. This led to comment on the dangers involved in transporting inflammables and explosives on highways, in which connection W. S. Topping, chief inspector of the Bureau of Explosives, Interstate Commerce Commission, told of rules recently promulgated by the Interstate Commerce Commission for interstate highway carriers. The new motor carrier regulatory bill, he thinks, will promote the extension of such rules to cover contract and intra-state carriers as well.

The committee on shop plants of which J. R. Peters, assistant manager of the Pennsylvania's insurance department, is chairman made a progress report on its 1933 assignment to revise the report. Mr. Peters suggested several features of the report as topics for discussion in the interest of developing new material for the revised document. He pointed out that the fire hazard in shops has been lessened somewhat by the increased use of steel equipment—both passenger and freight

Reporting for the hand book committee, T. E. Chapman, Jr., special representative of the Norfolk & Western, stated that, in its work of revising the hand book, this committee, having completed one-half of the revision, is awaiting further instructions. Upon the suggestion of Charles N. Rambo, honorary member and former manager of the insurance and protection section, United States Railroad Administration, it was decided to authorize the printing and distribution of revised sections in order to provide members with up-to-date information.

Mr. Bissell, the chairman, reported for the committee on terminal classification and storage yards that there had arisen no occasion to charge this report as last revised. He thought there had been "surprisingly few" yard fires in view of the increases both in the number of cars stored and in the number of trespassers. Discus-

(*Continued on page 512*)

Maintaining Safety at High Speed*

Trains inherently safer than vehicles requiring constant maneuvering—Track, signals, equipment improved, morale high

By Roy V. Wright
Managing Editor, Railway Age

WITH the introduction of the private automobile on a large scale, followed by the increasing use of the motor bus and the air plane with its high speeds, the railroads steadily lost passenger business for many years, but in 1934 the trend turned upward slightly. A further increase will be registered in 1935. Railroad managements realize that they face serious difficulties in attempting to build up their passenger business, and that only by unusual and spectacular efforts, based on high standards of service, can they stage a real and substantial come-back.

The public demands fast transportation, both passenger and freight. The demand for speed, as a matter of fact, has predominated over the demand for safety. Air traffic has continued to grow and the speed of highway traffic, by reason of heavy expenditures for straightening out curves, eliminating intersections and providing smoother surfaces, has increased tremendously. However, the cost in human lives of this speed is startling. The press and public are becoming increasingly aware of this cost and are beginning to agitate for action to correct these conditions, particularly as regards highway traffic. This agitation should serve to make the public more conscious of and desirous of safety in travel, and the railways should benefit from greater concern in this direction.

Railroads by Nature Safest Form of Inland Transport

For the fact must not be lost sight of that the railway is fundamentally by its very nature the safest form of inland transportation. The railway has the advantage over the motor vehicle in that it does not depend, as the motor vehicle does, upon fallible human alertness to keep the vehicle on the road and out of collision with other vehicles. The flanged wheel on the steel rail and modern signaling systems give the railways a fundamental safety superiority which it is difficult to see how motor transport can duplicate. Incidentally one of the problems of the railroads in these days is to protect their trains from motor vehicles at grade crossings.

An increasing proportion of the public, it would appear, is going to demand safety in travel, along with speed, comfort and convenience, and reasonable price. What are the railways doing to meet this demand?

The answer, in a broad way, is the provision of facilities over which modern and specially designed equipment can be operated successfully at high speeds with a maximum degree of safety. This may appear difficult of accomplishment. On the other hand, a critical study of developments over the past quarter of a century indicates that the foundations have been well laid for a more intensive development of rail transport.

Roadbed and track, the basis for rail transportation, have been vastly improved in the years since the war. A better understanding of drainage problems; deeper ballast; treated ties of larger dimensions; heavier rail sections of improved design and composition; improved and more substantial rail fastenings; the rail flaw detector which discloses internal defects in an almost uncanny manner; more efficient and effective methods of carrying out maintenance of way operations; greater refinement in track line and surface; the use of rail motor cars by maintenance and supervisory forces; the widespread installation of labor-saving machinery and devices—these are some of the things which have combined to provide a track over which heavy trains may be operated safely and comfortably at high speeds.

Powerful locomotives designed to operate with high sustained capacity have begun to replace the older types. In the interest of safety steel passenger cars have replaced wooden equipment. Freight cars have been designed with a view to reducing the expense of maintenance and increasing safety in long trains at higher speeds; improvements have also been made looking specifically to eliminating loss and damage to contents.

These improvements in locomotives and cars have tended to increase the weight of the equipment and the costs of operation, but this tendency has been offset by refinements which in various ways have cut down the unit costs of operation. The problem has been made more difficult in the case of passenger cars because of the necessity of making them more comfortable and luxurious.

Signals have been vastly improved. Originally conceived largely as safety devices, they have become a most important factor in expediting train movements and increasing the efficiency of operation.

From the beginning of the century an effort has been made to design self-propelled rail motor cars for use on light traffic and branch lines. It was a long, difficult task to develop sufficiently powerful internal combustion engines for this purpose, particularly since until comparatively recently special materials have not been available to make any very considerable reductions in the weight of the equipment.

Roughly this was the situation when the railroads were staggered by the falling off of business in 1930. They have had a desperate time during the depression and the same thing is true, of course, of railway equipment and supply manufacturers who depend upon the railroads for a livelihood. Out of these lean years, however, with increasing competition from other types of carriers, have come revolutionary developments, which are changing the whole outlook for the railroads. Both railroad managements and the railway supply interests did a lot of hard thinking and development work when business was at a low ebb. The results are now becoming evident in a most decided fashion.

Depression a Period of Development

Air-conditioning of passenger cars, with its attendant heavy expense, was started in the very bottom of the depression. The first announcement of high-speed stream-

* Address before the Safety Section, Association of American Railroads, and the Steam Railroad Section, National Safety Council, Louisville, Ky., October 16, 1935.

lined trains came in the summer of 1933, and since that time a considerable number of these trains have been built and placed in successful operation. There has also followed a speeding up of all passenger train service and unusual efforts have been made to attract business by making the accommodations more comfortable and the services more convenient.

The startling development of special materials and improvements in the construction of internal combustion engines, which made it possible to build articulated trains so light that relatively small built-in power plants provide much more horsepower per ton than is available for heavy main line passenger trains, proved the combination which set off the race of the railroads to speed up their passenger operations and go into an aggressive and determined fight to win back a fair share of the passenger business. The fight is now on, and the public knows it and is keenly interested in the outcome.

In considering high-speed passenger trains we must not overlook the fact that, while the streamlined articulated trains have had the center of the stage in the public eye, there have been other important developments which, while less spectacular, are of great significance.

Electrification of metropolitan suburban lines has speeded up local services, largely because of the rapid acceleration of electric trains; moreover, we now have electric service between New York and Washington, which, with standard equipment except for the locomotives, approximates the speed of the so-called streamlined trains.

The high-speed streamlined, Diesel-electric articulated trains of very light materials have been supplemented by a variety of combinations of high-speed equipment, including standard passenger cars drawn by rebuilt steam locomotives; specially designed cars drawn by specially designed light, high-speed steam locomotives, and other combinations.

Safeguarding High-Speed Operation

What, if anything, has been done to insure the safe operation of these high-speed trains? In an attempt to answer this question it will be necessary to present a composite picture.

In the first place it must be emphasized that these high-speed trains are operated over lines which have been built and are used for heavy high-class traffic. The problem of the amount of super-elevation of the outer rail on curves is greatly complicated by the spread between the speeds of the passenger and freight trains. Freight trains, however, have been considerably speeded up in recent years, and this, coupled with the lower center of gravity of some of the new high-speed trains, makes the problem less serious than might have been anticipated.

Another consideration which must not be overlooked is that while maximum running speeds have been increased, this increase is not nearly as great as the shortening of schedules between terminals would indicate. Generally speaking the high-speed trains make fewer stops and do very little work at the stations; moreover, these trains have been so designed that most of them can be accelerated and stopped much more quickly than the standard equipment. It must not be forgotten, either, that steady and continual improvement has been made in main line track over the years, to insure better and smoother operation.

Before introducing the high-speed trains it has been the practice to check critically every detail of the track construction. As a result, super-elevation of the outer rail on curves has been adjusted; curvature at critical points has been reduced wherever it could be done at reasonable expense; and the approaches to and run-offs from curves have been spiraled for easement. When this has been done—and it has not been as large or expensive a task in most instances as might be expected, because of the high track standards already existing—the train is operated over the road at high speed, observers watching and critically checking every detail. Further modifications are then made in the track, or the speed of the train is adjusted at critical spots to insure better riding. Slight irregularities in line and track surface, which would not be noticed at ordinary speeds, affect the operation at higher speeds. It is, therefore, necessary to maintain the track in prime condition at all times. One railroad officer says that the high-speed trains operate so differently over a given piece of track that it is necessary for the engineers to "learn the road all over again."

The problem is somewhat simplified in instances where the newly designed equipment is much lighter than the standard equipment, and also where the center of gravity is lower. In general, however, the changes required in the track have not been very extensive and in the ordinary course of events most of them would probably have been programmed within the next few years, even had no changes been made in passenger train schedules.

The problem of adjusting the signals to suit the high-speed trains is dependent upon the equipment used. The light, high-speed trains, with highly specialized brake equipment, automatically controlled, are stopped from top speed in about the same distance as in the case of the heavier standard equipment operated at a considerably lower speed. With the heavier, high-speed equipment using the standard high-speed passenger brakes, however, the braking distance is of course considerably increased, and it is necessary to respace the signals.

In general, the speeding up of freight and passenger trains in recent years has made some signal installations more or less obsolescent, and the installation of the high-speed trains has only hastened the day when radical improvements must be made.

An engineering officer, asked if the new high-speed trains had made heavy expenditures necessary in changing the track and signals, replied, "Yes, and no." He explained that these changes required the immediate expenditure of a considerable amount of money; on the other hand, in the ordinary course of events these improvements would have been required within the next few years. As a matter of fact, they had been scheduled on his road and the new trains simply hastened the making of the expenditures.

It has also been necessary to set back the contacts for grade crossing signals, to insure the 20-second warning required by the A.A.R. rules. In some instances additional crossings, less frequently used, have been protected with signals.

Equipment Design

Many things have been done in the design and construction of the power units and cars to minimize stress on the track and to insure ease and smoothness of operation, which, naturally, will be reflected in greater safety. A saving in weight of the equipment obviously decreases wear and tear on the track, reduces cost of operation and makes it much easier to accelerate the trains and stop them from high speeds. Special materials of light weight and great strength have been used for this purpose, and articulated trains have been introduced for the first time in trunk line service in this country.

The designers have taken special precautions to con-

struct the equipment in such a way as to insure a maximum degree of safety in case of accident. Moreover, nothing has been left undone to make the traveling on these trains easy and comfortable. Air conditioning, specially constructed seats, improved springs and truck suspension, better lighting and other appointments, set the traveler at ease; indeed, they give him a sense of luxury.

Naturally, starting out almost from scratch in designing and building these cars, some mistakes have been made. These, however, are being remedied. It is surprising that the first designs have worked out as well as they have and the designers and builders are to be congratulated for their success in this respect. In general, these trains ride easily and smoothly and it is difficult at times to realize that they are operating at speeds of 90 or 100 miles an hour. The very smoothness of riding is evidence of lack of punishment to the track and equipment—a further assurance of safety.

Outstanding features of the power units, whether Diesel-electric, rebuilt steam locomotives or newly designed locomotives, are the efforts which have been made to provide rapid acceleration and to insure smooth riding. The use of the "dead man's handle" in Diesel-electrics and unusually successful efforts to improve the counter-balance and reduce the dynamic augment of the steam locomotive, are typical of some of the steps which have been taken to insure safe and smooth operation.

Prior to the inauguration of new high-speed runs, the tentative schedules, laid out after careful calculation, are checked in actual operation and adjusted as necessary. The problem then becomes one of educating the crew to the new requirements and restrictions. As typical of the care which is taken in this respect, one road has carefully laid out zones over which certain top speeds are to be observed, with special restrictions wherever necessary. Roadside signs indicate the zone speeds and restrictions. In general, the engineman is carefully cautioned as to the maximum speeds which can be used at various points along the line. On some roads he is assisted in checking speeds by the use of speed recorders.

Good care must be taken of dray horses or ordinary carriage horses, but unusual and special attention must be given to race horses. The high-speed trains are the race horses of the railroads and one senses this fact in riding them. The entire crew, as well as employees along the line, are keyed up for this more intensive type of service. It is interesting, for instance, to note the extraordinary alertness of the brakeman, who sits at the rear of the observation car on one of these trains. Employees along the road are required to look over the train as it rushes past, and to signal to the brakeman at his post all is well. If they note anything unusual that may need attention, they must so indicate. The brakeman is required to acknowledge every one of these signals from trackmen, crossing watchmen, signal men, station men, passing trains, etc.

In the same spirit the train is critically inspected at each stop. The inspection at terminals between runs is almost microscopic in its thoroughness.

These trains have also placed a larger responsibility upon the police department. More than ever is it important that children and trespassers be kept off the track and that good housekeeping be observed in keeping loose materials off the right-of-way.

"Safety First" Never Forgotten

"Safety first" efforts, always regarded as of first importance, promise to have an even more impressive part in railroad operations. Here again, the foundations have been soundly laid for a more intensive use of the railway plant. Steadily over the years practices have been improved and techniques developed, which slowly but surely have forced down the number of casualties to both passengers and employees. American railroads today enjoy an enviable record for safe operation.

Incidentally, in this respect it is interesting to note that among the railroads which have introduced high-speed trains are those which have enviable safety records, standing at the very top of the list in this respect. The new trains, in turn, have already done much to encourage the personnel to strive for still higher standards of safety observance. We may say with some confidence that the public, which is demanding higher and higher speeds of our transportation agencies. and which insists upon greater ease and comfort in travel, is adequately safe-guarded in new, high-speed rail services.

Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading in the week ended October 5 totaled 706,877 cars, an increase of 74,471 cars as compared with the corresponding week of last year and of 76,106 cars as compared with the week before. This was, however, slightly less than the total for the week ended September 21, when 707,644 cars were loaded. Grain, forest products, and ore showed reductions as compared with the figures for the week before, but all commodity classifications except live stock showed increases as compared with last year. The summary, as compiled by the Car Service Division of the Association of American Railroads, follows:

Revenue Freight Car Loading

For Week Ended Saturday, October 5

Districts	1935	1934	1933
Eastern	149,169	130,765	138,150
Allegheny	129,560	109,203	122,610
Pocahontas	47,587	43,781	42,881
Southern	101,907	88,606	90,714
Northwestern	114,604	97,810	104,909
Central Western	107,666	105,928	106,738
Southwestern	56,384	56,313	56,371
Total Western Districts	278,654	260,051	268,018
Total All Roads	706,877	632,406	662,373
Commodities			
Grain and Grain Products	37,523	31,764	31,914
Live Stock	19,581	29,782	22,466
Coal	128,521	118,444	113,575
Coke	7,821	5,612	7,084
Forest Products	31,999	22,371	25,403
Ore	33,395	19,272	37,213
Merchandise L.C.L.	168,750	165,108	174,720
Miscellaneous	279,287	240,053	249,998
October 5	706,877	632,406	662,373
September 28	630,771	646,084	669,186
September 21	707,644	644,498	659,866
September 14	700,357	647,485	660,086
September 7	592,786	563,883	577,933
Cumulative Total, 40 Weeks	23,845,295	23,994,858	22,277,053

Car Loading in Canada

Car loadings of revenue freight in Canada for the week ended October 5 totaled 58,364, the highest point reached this year, according to the compilation of the Dominion Bureau of Statistics.

	Total Cars Loaded	Total Cars Rec'd from Connections
Totals for Canada:		
October 5, 1935	58,364	22,962
September 28, 1935	55,766	22,102
September 21, 1935	56,018	20,596
October 6, 1934	53,050	18,832
Cumulative Totals for Canada:		
October 5, 1935	1,775,112	846,737
October 6, 1934	1,752,260	867,802
October 7, 1933	1,504,620	734,538

Passenger Traffic Officers Meet at Cincinnati

Measures employed by carriers to increase revenues bring results—speed and equipment important factors

THE effectiveness of the measures employed by the railways to increase passenger revenues was revealed in detail at the seventy-seventh annual meeting of the American Association of Passenger Traffic Officers at Cincinnati, Ohio, on October 8-9, president A. J. Dickinson, passenger traffic manager of the Great Northern presiding. Reports and addresses dealt with improvements in passenger service, special emphasis being placed upon the importance of advertising, new trains, air-conditioning and dining car service in increasing travel. Officers elected for the ensuing year are: President, C. C. Howard, passenger traffic manager of the Erie; vice-president, G. P. James, general passenger agent of the Atlantic Coast Line; and secretary, W. C. Hope, re-elected.

Hiawatha's Earnings Large

One of the most pronounced gains in passenger revenue was attributed to the high-speed trains that have been put on by several railroads during the last year. G. B. Haynes, passenger traffic manager of the Chicago, Milwaukee, St. Paul & Pacific, reported that one-third of the passengers on the Hiawatha constituted new business and that as a result of the heavy patronage, the train is earning $3.65 a mile. The earnings per car amounted to $500 in July, while in August they amounted to $1,000, 6 to 8 cars being operated in each train during both months. The revenues from the tap room car were equally impressive, the receipts from the bar amounting to $228 per trip.

The train, according to Mr. Haynes, has been exceptionally popular, measured not only by the patronage but by the large number of people who congregate along the right of way to watch the Hiawatha pass. Contrary to the experience of many roads which have improved their coach equipment, with a resulting loss in parlor car patronage, the parlor cars of the Hiawatha have been sold out three days in advance. Owing to a demand for express service and the possibilities of further increasing the earnings of the train, an express car has been added to the consist of the Hiawatha.

This train, Mr. Haynes said, has not affected the earnings of night trains and has resulted in increased business between Chicago and the Twin Cities, as measured by the total business of all trains which, during August, showed an increase compared with April, omitting the Hiawatha figures.

"400" and Flambeau Show Remarkable Results

R. Thompson, passenger traffic manager of the Chicago & North Western, reported equal success for the "400", which has taken one-half of its passengers from the highway and has shown a 78 per cent increase in revenues, compared with 7 per cent for the system as a whole. The Flambeau, which the North Western put on last summer as a high-speed week-end train between Chicago and the North Woods of Wisconsin, Mr. Thompson said, has shown remarkable results and reflects the desire of the public to ride fast trains. This train afforded departure from Chicago in the afternoon with arrival in the Northern Wisconsin woods at 9:30 p.m., and from mid-July to Labor Day was operated in two sections. Mr. Thompson expressed the opinion that faster trains are a factor in recapturing business and supported this opinion by the fact that people are driving their automobiles up to 40 miles to ride the North Western's fast trains.

Streamliners Take Business From Highways

The Union Pacific's high-speed trains, according to W. S. Basinger, passenger traffic manager, have not only proved to be revenue producers but have developed many interesting characteristics of the traveling public. The Kansas City-Salina train, the route of which is paralleled by Union Pacific stages, has secured one-third of its business from the highway. To show the popularity of this train, Mr. Basinger said that on several occasions 250 persons rode the train into Kansas City, although it provides seats for only 112. On these trips, persons were determined to ride the train and were willing to stand in the aisles or sit on each other's laps. The demand for this new type of equipment and service was demonstrated by the occasion when an ordinary steam train was substituted, on the same schedule, for the streamlined train, with the result that business on this line fell off considerably.

The streamliner, "City of Portland," according to Mr. Basinger, was so well patronized that passengers have been willing to use upper berths, with the result that both uppers and lowers were sold out completely since the train was placed in service. Because the through business filled the train, it is necessary to restrict reservations for intermediate points until the day of departure when intermediate business is handled, if space permits. Mr. Basinger estimated that about one-fifth of the business of this train has been taken from buses and private automobiles.

H. F. McCarthy, general passenger agent of the Boston & Maine, reported that the "Flying Yankee" of the Boston & Maine and the Maine Central has handled an average of 162 passengers daily, of which 48 per cent have been recaptured and 52 per cent have been taken from regular trains. Of the recaptured business, 5.7 per cent have been taken from air lines and 13.2 per cent from buses. When the train was new, 9 or 10 per cent of the passengers rode the train because of its novelty, but at the present time, this has dropped to about 5 per cent.

Air-Conditioning Now a Year-Round Matter

That air-conditioned cars have not only increased railroad travel but have resulted in a more satisfied patronage was revealed in the general discussion. The opinion was expressed that since the public has become ac-

customed to air-conditioned cars and their cleanliness and comfort, it is essential that the railroads install more air-conditioning equipment as rapidly as possible for year-round service. One of the problems experienced during the last summer was that of securing a sufficient number of air-conditioned sleeping cars to handle increased business on trains that have been advertised as completely air-conditioned.

Champ Carry, vice-president and assistant to the president of the Pullman Company, explained that the demand for air-conditioned Pullman cars has created a complex problem because of the fluctuations that occur in traffic and because the public is demanding air-conditioned equipment as an all-year-round feature. Because of the large amount of money required to install air-conditioning equipment in all Pullman cars, such a procedure is impossible at present and the Pullman Company is giving consideration to the formation of a pool of air-conditioned cars which can be supplied to railroads during peak movement at a charge sufficient to cover the cost and maintenance of these cars.

Dining Car Service a Factor in Patronage

The discussion of dining car service showed that it is a factor in patronage, and resolved itself into a debate on the question whether the business obtained by service that results in dining car losses develops enough additional revenue to justify such losses. The Pennsylvania, according to J. F. Finnegan, general superintendent of dining car service, has made an effort to keep its dining car losses at a minimum but in order to satisfy the demand for lower cost meals, has established off-hour dining car service on all coach trains. Under this plan, dining car stewards, after determining when the parlor and sleeping car demand will occur, invite coach passengers to partake of special menus offering a selection of fish, meat or eggs and served at lower prices in the dining car before and after the rush period. From September 9 to October 1, between 1,500 and 2,000 persons have been served in off-hours, the total representing 2 per cent of the total meals served. As a result of this practice, persons not in the habit of frequenting dining cars, are using them.

The practice of the Union Pacific, as told by Mr. Basinger, has been based on the theory that the small loss per meal is inconsequential as compared with the revenue secured through the sale of the ticket. The experience has shown that passengers who rise early do not wish to wait until 9 o'clock for an off-hour breakfast, so the Union Pacific has established off-tray service whereby coach passengers may secure food when desired from portable tables now on all trains. On the Challenger, a special all-coach train featuring three meals for a total price of $1, as many as 175 persons are served per meal, passengers starting to eat at 6 o'clock and continuing all day. Mr. Basinger felt that because of these low-cost meals, passengers were being taken from buses. While the price is 25 cents for breakfast, 30 cents for lunch and 35 cents for dinner, the average check is 37.5 cents, due to the fact that although customers are anxious to hold down the cost of their meals, they will select additional food from the a la carte menu.

Advertising Boosts Western Lines' Revenues

Another factor which was cited as important in the development of passenger traffic and which has played a large part in increasing revenues, particularly in the West, is advertising. The effect of advertising on passenger revenues in the western territory was demonstrated by figures supplied by H. W. Siddall, chairman of the Transcontinental Passenger Association, which showed that as a result of the advertising campaign conducted by the western lines in June, revenues during the first eight months of the year increased 9.16 per cent on the Western lines and 4.48 per cent on the lines in the Southeast, while in the East they declined approximately 1 per cent, as compared with the same period in 1934. During August, the comparison was even more striking, the increase in revenues amounting to 12.18 per cent in the West and to 1.34 per cent in the Southeast, as compared with a decrease of 1.20 per cent in the East. So far this year, travel to the Pacific Coast has increased 62 per cent, as compared with last year, while that to national parks likewise has shown a substantial improvement.

In the report of the Committee on National Publicity, D. M. Bowman, passenger traffic manager of the New York Central Lines, recommended a program of joint advertising in which all lines should participate. The Association of American Railroads is now considering the feasibility of a program of national advertising.

During the discussion of advertising, Mr. Thompson, of the North Western, expressed the opinion that there is need for more local advertising. A. D. Bell, assistant passenger traffic manager of the Missouri Pacific, called attention to the publicity value of the western lines advertising campaign, which focused attention on all railroads. Its effect on the Missouri Pacific was reflected in an increase in passenger revenues amounting to 10.8 per cent in June, 6 per cent in July and 9.5 per cent in August, or a total of 8.5 per cent for the three months, compared with the same periods in 1934. F. W. Conner, assistant passenger traffic manager of the Pennsylvania, opposed joint advertising and in support of his position called attention to the individual advertising appropriations of motor car manufacturers, tobacco companies and other large industries.

No Marked Change In Bus Competition

In addition to these subjects, consideration was given to competitive forms of transportation and to proposals for securing additional revenues. The Committee on Motor Coach Service in Competition reported that figures published by the National Association of Motor Bus Operators indicates that there has been no very marked change in this form of competition with the railroads. During 1934, the gross passenger revenues of the Class I steam railroads amounted to $346,000,000; of electric railways, including surface, elevated and subway lines, $539,000,000; and of motor bus lines, including city, intercity and sightseeing, $311,000,000. Thirteen per cent of the rail revenue was obtained from commutation sources, leaving about $300,000,000 for all other kinds of rail passenger transportation. Of the $311,000,000 of bus revenue, $171,000,000 was obtained from intercity routes, indicating that intercity traffic provided 64 per cent of the travel for the railroads and 36 per cent for the buses.

Airline Competition Becoming More Serious

The report of the Committee on Commercial Aviation Development showed that the miles flown by commercial transport planes during 1934 totaled 48,786,551, as compared with 54,642,545 in 1933, a decrease of 10.7 per cent. Passenger miles flown, however, totaled 225,267,559 in 1934, as compared with 198,800,079 in 1933, an increase of 13.3 per cent, while the passengers carried decreased from 568,940 in 1933 to 561,370 in 1934, or 1.3 per cent. The passenger fare per mile averaged 5.9 cents in 1934, as compared with 6.1 cents in 1933,

indicating the growing seriousness of airline competition; for, as the margin between air and rail fares becomes less, there is bound to be a tendency for the airlines to establish local service for business moving between points less than 500 miles distant. Airlines are in some cases offering circle tours in conjunction with steamship and scrip books at a 15 per cent reduction. Furthermore, the airlines are continuing to reduce their operating costs through increased speed of planes and accumulated experience. Airlines have reduced their running time until the elapsed time between Chicago and Los Angeles, Cal., 12 hr. 26 min., and between New York and Los Angeles, 15 hr.

The importance of the elimination of ticket scalping in conserving passenger revenues was reflected in a report on ticket scalping made by H. A. Koach, manager of the Railway Ticket Protective Bureau. After reviewing the successful efforts of the bureau during the past year, Mr. Koach emphasized the need of constant agitation, to secure the enforcement of ordinances in local districts. As a result of the discussion of ticket scalping, the association passed a resolution recommending that the Association of American Railroads endeavor to secure the passage of a national ticket scalping law at the next session of Congress.

Motor Carrier Bill Will Have Beneficial Effect

It was generally believed that the motor carrier bill will have a beneficial effect on passenger revenues, from a competitive standpoint. This bill, as explained by Mr. Siddall, will eliminate the abuses of share-expense travel and will do much to improve the competitive situation. Bus operators already recognize the need for closer co-operation with railroads and at a recent meeting with western lines expressed a desire to join with the railways in the formation of joint service and fare adjustments.

A plea for co-operation between rail carriers and steamship lines was made by Joseph Mayper, chairman and counsel of the Transatlantic Passenger Conference. Among the projects which a joint rail-water committee has been working on to promote travel combining steamship and railroad hauls are the development of party movements from Europe to North America, involving rail tours in the United States; the promotion of travel from the North American continent to Europe; the establishment of special reduced rail fares for holders of steamship tickets; and the sale of steamship transportation by railroad agents and rail transportation by steamship agents.

While the program of the meeting was designed to eliminate the discussion of such controversial matters as basic fares and to avoid consideration of the Co-ordinator's passenger traffic report, these subjects were referred to frequently throughout the meeting. The Committee on Standard Forms of Interline Tickets recommended that no change be made in the fundamental principles under which interline tickets are now issued by the railroads, this action being opposed to the suggestion made in the Co-ordinator's report that tickets be shortened and simplified. The advantages of a simplified form of interline tickets, according to the committee, are a saving in ticket expense, a saving in the room and in ticket offices necessary for ticket stock and an alleged greater convenience to passengers. The disadvantages cited by the committee were that practically no opportunity was afforded intermediate railroads to check the reports of revenue on interline tickets; the inadequacy of a necessary system whereby each conductor handling an intermediate ticket would be required to make a complete report; the damage suffered by small tickets where many conductor's punches are required; insufficient room for endorsement for stopovers; complications arising from optional routing in exchange arrangements on interline journeys; loose accounting methods, resulting in confusion among passengers and conductors; and losses in revenue due to the inability of the railroads to prorate interline revenues.

Emery Sees Great Opportunities for Increasing Business

The program departed from the original intention of avoiding discussing the Co-ordinator's passenger traffic report when John C. Emery, director of Passenger and Merchandise Service, Federal Co-ordinator of Transportation, addressed the meeting. Mr. Emery gave a brief review of what the Co-ordinator's Section of Transportation Service has done during the last two years and outlined what the Co-ordinator's organization has in mind for the next eight months. He said, "While it was costly to produce it is capable of paying such generous dividends to the railways as to make the initial investment seem paltry by comparison. In the report you have an extensive and intensive study of the problems which confront you every day. Disregard for the present the recommendations in the report. Consider only the underlying data. You will find here the clearest picture which could possibly be presented of your business and the factors affecting it. It is not a simple picture because yours is not a simple business. It is a complicated affair, as your business is, but it is complete as no other picture of your business has ever been.

"The conclusions leave with me the firm conviction that the railway passenger business is not on its way out, but on its way in; that there is a huge market still unplowed but definitely subject to railway cultivation; that the passenger business offers the outstanding hope for large and immediate expansion of railway revenues and income; and that the railways have the resources in men and equipment to turn this hope into actuality.

Time to Translate Findings into Action

"Now the research work is done, and the time has come to translate findings into action. This policy was stated by Co-ordinator Eastman on August 5, when he said: 'The opportunities for profitable research have by no means been exhausted, but during the current year it will be the primary purpose to promote positive results from the work already done. Based on their research, the staff of the Co-ordinator have made many recommendations for improvements covering a very wide field. Even if there were general agreement on their soundness and practicability, it would take a long time to carry all of these recommendations into effect. The opportunity for comparatively early accomplishment is much more promising in some cases than in others. Without abandoning any part of the program, it will be the aim of the Co-ordinator and his staff to start action through as many entering wedges as possible. Attention will, therefore, be concentrated on the plans and projects which appear to offer the most immediate hope along these lines.

" 'Every effort will be made to co-operate and work in harmony, so far as reasonably possible, with the regional co-ordinating committees and the Association of American Railroads, but contact will be maintained, also, with the individual railroads and particularly with those managements which appear to be most enterprising and progressive. The object will be to get results, without preoccupation with the credit for the results. Nor will there be slavish devotion to particular methods. It is realized that step-by-step progress in the solution of certain of the problems may be necessary'."

Report on Stores Handling

Co-ordinator's property section sees $8,000,000 saving in general adoption of mechanical methods

IN a 166 page report, Federal Co-ordinator Joseph B. Eastman has presented to the executives of Class I railroads the results of studies made by his Section on Property and Equipment on the handling of stores material. The report deals primarily with the use of mechanical methods of handling material and while comprising a digest of information contained in the proceedings of the Purchases and Stores Division A.A.R. and other sources, including the *Railway Age*, it presents a detailed analysis of the studies made of four large railroads. Contained in the report are elaborate details on the cost of handling selected kinds of material mechanically and by hand, including fixed charges, operating and maintenance costs on mechanical handling equipment, savings effected through the use of such equipment and other related information.

It is concluded, among other things, that, on the basis of present costs and a normal volume of materials handled, savings amounting to $8,000,000 a year would probably result to all the roads through the use of the best available methods and equipment in this field. Purchasing and stores officers representing more than 35 per cent of all Class I roads are said to have reviewed this report and recommended it for publication as a useful fund of information in pointing out means whereby substantial savings can be made by individual roads in handling materials and supplies. The report, which emphasizes the need for uniform cost accounting, is reproduced in part as follows:

Four roads are covered in this report: One eastern road, one located in the central west, one in the far west and one in the southwest. They are designated throughout as A, B, C and D.

The year 1933 was selected as a basis for determining actual operation and maintenance costs of handling equipment. Purchases and disbursements of material were lower during that year than during any other year since the stores department began to use mechanical handling equipment to any great extent. It seemed probable that the average number of machine-hours worked by such equipment during 1933 would be lower, and that the total cost per machine-hour worked, including operation, maintenance, interest and depreciation, would be correspondingly higher than during any other year. It was therefore reasonable to assume that if savings could be effected through the part-time use of mechanical equipment during this particular year, it would logically follow that greater savings would result if there were any increase in the volume of stores operations.

The materials selected for study are fairly representative, as to kind, size and quantity of materials handled in volume by the stores departments, and the cost of handling them and others similar in size, weight, packaging, etc., constitutes the major portion of stores expense. All kinds of powered equipment used more than 50 per cent of the time by the stores department, and all non-powered and hand equipment were considered in the study of handling operations.

Handling on Skids

Special field studies were made to develop the advantages of having materials delivered to the railroads on skids. In making these studies, a number of different items were loaded on skids, and the skid loads put into cars at the receiving platform. They were then unloaded and conveyed to storage space by means of lift trucks. These studies showed that the use of skids and lift trucks to handle certain materials offered greater possibilities for savings than could be obtained through the use of any other kind of equipment: For example, the cost of such handling per ton ranged from 36.7 per cent (driving box grease) to 92.9 per cent (fire brick) less than the cost of unloading and handling by hand.

At the storehouses included in this study only one case was found in which material was shipped regularly from the manufacturer's plant to the railroad on skids. The material in this case consisted of buttonhead rivets, shipped in open-top box skids furnished by the railroad. The cost of unloading and handling this material, as received on skids, was 53.8 per cent less per ton than the cost of hand operations required when the material was shipped in kegs. The railroad made a further saving through an allowance made by the manufacturer for kegs not used.

The use of skids generally permits the loading of as much, and in many cases more, lading per car as other methods. After the car has been loaded with skids, other items such as pipe, bar iron, and lumber may be loaded on top of the skids. The time consumed in loading and unloading a car is very much less than by other methods.

In most instances, handling by gantry crane and magnet proves remarkably economical compared with handling by other kinds of equipment. Even so, this handling cost is not as low as that obtained by using lift trucks and skids, provided the material is received on skids. In other words, the full benefit of skid handling cannot be realized unless the material is received on skids. This clearly emphasizes the fact that one handling operation (loading or unloading, or delivery to point of use) should not be considered independently of another. Just as incoming materials should be received in the manner most suitable for the particular type of handling to which they are adapted, equipment also should be co-ordinated; lift trucks with tractors, skids with trailers, etc.

Handling lumber by locomotive crane with chains, hooks, slings, or combinations of these shows a substantial saving over handling by hand, money savings ranging from 22.8 per cent (rough heavy fir) to 62.0 per cent (poles), of the cost of hand handling. One exception to this shows a higher cost per thousand board feet for handling rough light lumber ($1.2827) by locomotive crane than by hand ($1.1975), although the locomotive crane method requires 31.9 per cent less man-hours than the hand method.

An expert operation of unloading loose car wheels by hand was observed on one road. This operation, which seemed as efficient as a hand operation could be, cost $0.0334 per ton. However, under comparable conditions, this same unloading process was done by gantry crane and magnet for a total cost of $0.0150 per ton or 55.1 per cent less.

Tractors and trailers form an important class of equipment used extensively in the delivery of material to point of use on railroad premises. Due to the lack of time, attention was concentrated on unloading and loading operations which do not involve the use of tractors and trailers to the extent that delivery does. Therefore, the report contains less data on tractors and trailers than on other types of equipment. However, such information as is given on their costs of operation and maintenance in loading and unloading will be found of value for estimating their usefulness in delivering goods.

Detailed Cost Studies

Sixty-four detailed cost studies were made. Each study shows the cost of handling one ton and in the case of lumber, both the cost per ton and per 1,000 bd. ft. In a number of the studies, the cost per unit, such as keg, carton, box, crate, drum, etc., is also shown. The cost per hour of operation and maintenance, and interest and depreciation on the actual equipment used in each operation studied was based on the number of hours the machine worked during the year 1933, that is, the total of these costs for 1933 was divided by the number of machine-hours the equipment

Comparisons of the Cost of Mechanical Handling of Materials, With Costs of Handling by Hand

Material handled	Equipment used	Road on which study was made	Unloading: Mechanical: Total cost Per ton	Unloading: Mechanical: Total man-hrs. worked Per ton	Unloading: Mechanical: Savings effected over handling by hand: Monetary Per ton	Unloading: Mechanical: Savings effected over handling by hand: Monetary Per cent	Unloading: Mechanical: Savings effected over handling by hand: Man-hours Per ton	Unloading: Mechanical: Savings effected over handling by hand: Man-hours Per cent	Unloading: Hand: Total cost Per ton	Unloading: Hand: Total man-hrs. worked Per ton	Loading: Mechanical: Total cost Per ton	Loading: Mechanical: Total man-hrs. worked Per ton	Loading: Mechanical: Savings effected over handling by hand: Monetary Per ton	Loading: Mechanical: Savings effected over handling by hand: Monetary Per cent	Loading: Mechanical: Savings effected over handling by hand: Man-hours Per ton	Loading: Mechanical: Savings effected over handling by hand: Man-hours Per cent	Loading: Hand: Total cost Per ton	Loading: Hand: Total man-hrs. worked Per ton
			Dollars		Dollars				Dollars		Dollars		Dollars				Dollars	
Air conditioning material	Portable crane, wagons, and tractor	C	.6622	2.12500	1.5351	69.9	7.4649	82.9	2.1973	9.00000	none ever loaded	....	...	....	...	none ever loaded	
Axles, car	Gantry crane and manet	A	.0238	.01520	....	...	....	...	no study		.0238	.01520	....	...	....	...	no study	
do	Locomotive crane and chains	C	.1455	.18617	.5240	78.2	1.2322	86.9	.6695	1.41844	.1455	.18617	.5240	78.2	1.2322	86.9	.6695	1.41844
Axles, car and engine truck	Half gantry crane and hooks	A	.1893	.11142	....	...	....	...	no study, too dang.		.1893	.11142	....	...	....	...	no study, too dang.	
Axles, car and tank	Crane truck and tongs	C	.2506	.45500	....	...	....	...	no study, too dang.		.2506	.45500	....	...	....	...	no study, too dang.	
Axles, driving	Crane truck	A	.1387	.24366	....	...	....	...	no study, too dang.		.1387	.24366	....	...	....	...	no study, too dang.	
Battery renewals	Tractor and trailers	C	.3130	.64286	.0710	18.5	.2142	25.0	.3840	.85714	.3130	.64286	.0710	18.5	.2142	25.0	.3840	.85714
Beams, brake	do	C	.4522	.77778	.6234	58.0	1.8210	74.5	1.0756	2.44444	.4522	.77778	.6234	58.0	1.8210	74.5	1.0756	2.44444
do	Lift truck and skids[1]	A	.0696	.02745	....	...	....	...	no study		.0696	.02745	....	...	....	...	no study	
Bearings, journal, car	do	D	.0450	.03077	.4350	90.6	1.1692	97.4	.4800	1.20000	.0450	.03077	.4350	90.6	1.1692	97.4	.4800	1.20000
do	do	A	.0440	.02240	....	...	....	...	no study		.0440	.02240	....	...	....	...	no study	
do	do	C	....	.....	....	...	....	...	1.0741	2.62857	....	.....	....	...	....	...	no study	
do	Handled by hand on road studied	A	.2887	.16988	....	...	....	...	no study		.2887	.16988	....	...	....	...	no study	
do	Half-gantry crane and chains	A	.0480	.03333	....	...	....	...	no study		.0480	.03333	....	...	....	...	no study	
Bolsters, car	Gantry crane and magnet	D	.2400	.53679	.5017	67.6	1.2047	69.2	.7417	1.74149	.2400	.53679	.5017	67.6	1.2047	69.2	.7417	1.74179
do	Lift truck and skids	D	.0528	.03265	.6889	92.9	1.7088	98.1	.7417	1.74149	.0528	.03265	.6889	92.9	1.7088	98.1	.7417	1.74179
Brick, fire	do[1]	A	.0621	.04000	....	...	....	...	no study		....	.....	....	...	....	...	no study	
do	do	A	....	.....	....	...	....	...	no study		.1561	.24000	....	...	....	...	no study	
Coal, blacksmith	Lift truck and skids	A	....	.....	....	...	....	...	.7145	1.68000	no study		....	...	....	...	no study	
do	Locomotive crane and clam shell	D	.0562	.06498	.6583	92.1	1.6150	96.1	.0594	.12714	no study		....	...	....	...	.0594	.12714
do	Handled by hand on road studied	C	....	.....	....	...	....	...	.6068	1.42222	.3840	.66667	.2228	36.7	.6955	46.1	.6068	1.42222
Compound, water treating (in barrels)	Lift truck (hand) and skids[1]	A	.3840	.66667	.2228	36.7	.6555	46.1	.5596	1.14591	no study		....	...	....	...	.5596	1.14591
Grease, driving box	Handled by hand on road studied	C	....	.....	....	...	....	...	.9397	2.03175	.7795	1.58730	.1602	17.0	.4495	21.9	.9397	2.03175
Iron, laurel—¾", 1", 2"—16' lengths	Tractor and wagons	C	.7795	1.58730	.1602	17.0	.4495	21.9	.9397	2.03175	.7795	1.58730	.1602	17.0	.4495	21.9	.9397	2.03175
Lagging, boiler, magnesia (cartons)																		
Lumber:																		
Chestnut poles 25'—35'	Locomotive crane and hooks	B	.1609[2]	.18836[2]	.2627[2]	62.0	.6336[2]	77.1	.4236[2]	.82192[2]	no study		....	...	....	...	no study	
Creosoted douglas fir piling	do	D	.1559	.21480	....	...	....	...	no study		.2179	.29949	....	...	....	...	no study	
Untreated douglas fir piling	do	D	.1559	.21480	....	...	....	...	no study		.2179	.29949	....	...	....	...	no study	
Creosoted switch ties	Handled by hand on road studied	D	....	.....	....	...	....	...	.0736	1.38504	no study		....	...	....	...	.0736	1.38504
Rough heavy fir 3¼", 5½" x 42'	Locomotive crane and chains	C	.5371	.87051	.1582	22.8	.8705	50.0	.6953	1.74102	.2883	.45702	.1984	40.8	.7617	62.5	.4867	1.21872
do	do	C	.9393[4]	1.52230[4]	.2766[4]	22.8[4]	1.5223[4]	50.0[4]	1.2159[4]	3.04460[4]	.5042[4]	.79921[4]	.3470[4]	40.8[4]	1.3320[4]	62.5[4]	.8512[4]	2.13122[4]
Rough fir stringers 8" x 17" x 30'	Locomotive crane and hooks	D	.0644	.08877	....	...	....	...	no study		.0644	.08877	....	...	....	...	no study	
do	do	D	.1129[4]	.15560[4]	....	...	....	...	no study		.1129[4]	.15560[4]	....	...	....	...	no study	
Rough dry fir 2" x6" x 18'	Tractor and push cars	D	no study	.....	....	...	....	...	no study		.5617	1.16893	....	...	....	...	no study	
do	do	D	no study	.....	....	...	....	...	no study		.7022[4]	1.46117[4]	....	...	....	...	no study	
Rough fir decking 2" x 6"	Handled by hand on road studied	C	....	.....	....	...	....	...	.7600	1.98333	no study		....	...	....	...	.7600	1.98333
do	do	C	....	.....	....	...	....	...	1.1410[4]	2.97500[4]	no study		....	...	....	...	1.1410[4]	2.97500[4]
Misc. B. & B. douglas fir (steamer shipmt.)	do	C	....	.....	....	...	....	...	1.222C	3.00506	no study		....	...	....	...	no study	
do	do	C	....	.....	....	...	....	...	1.8340[4]	4.50760[4]	no study		....	...	....	...	no study	
No. 1 Common rough redwood lumber	Locomotive crane and sling	D	.3668	.57760	.2592	41.4	.7804	57.5	.6260	1.35802	.1280	.17637	.2560	66.7	.7055	80.0	.3840	.88185
do	do	D	.7333[4]	1.15480[4]	.5183[4]	41.4[4]	1.5603[4]	57.5[4]	1.2516[4]	2.71509[4]	.2557[4]	.35261[4]	.5119[4]	66.7[4]	1.4104[4]	80.0[4]	.7676[4]	1.76305[4]
Rough light lumber	Locomotive crane and chains	C	.6434	1.01871	.0428[5]	7.1[5]	.4782	31.9	.6006	1.49688	.3676	.58212	.0329[5]	9.6[5]	.2491	30.0	.3347	.83118
do	do	C	1.2827[4]	2.03361[4]	.0852[4,5]	7.1[4,5]	.9539[4]	31.9[4]	1.1915	2.98755[4]	.7330[4]	1.16182[4]	.0658[4,5]	9.8[4,5]	.4979[4]	30.0[4]	.6672[4]	1.65975[4]
Nails, kegs	Tractor and trailers	C	.5391	.96530	.1735	24.3	.6572	40.5	.7126	1.62345	.5391	.96530	.1735	24.3	.6572	40.5	.7126	1.62345
Oil, lubricating (drums)	Handled by hand on road studied	C	....	.....	....	...	....	...	.1336	.28571	no study		....	...	....	...	.1336	.28571
Oxygen, (cylinders)	do	C	....	.....	....	...	....	...	.4810	1.00418	no study		....	...	....	...	.4810	1.00418
Pipe, wrought steel ¼"-3" inc.	Portable crane	C	.7009	1.43333	.1858	21.0	.5667	28.3	.8867	2.00000	no study		....	...	....	...	no study	
Plates, tie	Locomotive crane and magnet	C	.1030	.05000	.0406	28.3	.2567	83.7	.1436	.30666	.1030	.05000	.0406	28.3	.2567	83.7	.1436	.30666
do	do	D	.0600	.06944	.1730	74.2	.5048	87.9	.2330	.57422	.0600	.06944	.1730	74.2	.5048	87.9	.2330	.57422
Pumps, air	Lift truck (hand) and skids[1]	A	.1359	.24615	.3494	72.0	90.25	78.6	.4853	1.14869	.1359	.24615	.3494	72.0	.9025	78.6	.4853	1.14869
do	Lift truck and skids[1]	A	.0762	.04068	....	...	....	...	no study		.0762	.04068	....	...	....	...	no study	
Rivets, buttonhead	do	B	.1060	.11113	.1233	53.8	.3389	75.3	.2293	.45000	.1060	.11113	.1233	53.8	.3389	75.3	.2293	.45000
Shoes, brake, car	Gantry crane and magnet	A	.0367	.01175	....	...	....	...	no study		.0367	.01175	....	...	....	...	no study, too dang.	
do	Lift truck and skids	A	.0965	.15835	....	...	....	...	no study		.0965	.15835	....	...	....	...	no study, too dang.	
do	Lift truck and skids[1]	A	.0299	.01668	....	...	....	...	no study		.0299	.01668	....	...	....	...	no study, too dang.	
do	Tractor and trailers	A	.1457	.29993	....	...	....	...	no study		.1457	.29993	....	...	....	...	no study, too dang.	
do	do	C	.4971	.86666	.0476	8.7	.3666	29.7	.5447	1.23333	.4971	.86666	.0476	8.7	.3666	29.7	.5447	1.23333
do	Handled by hand on road studied	C	....	.....	....	...	....	...	.0713	.16463	no study		....	...	....	...	.0713	.16463
Spikes, track (kegs)	Lift truck (hand) and skids[1]	A	.1904	.34483	.1776	48.3	.5173	60.0	.3680	.86209	.1904	.34483	.1776	48.3	.5173	60.0	.3680	.86209
Springs, driving	Locomotive crane and sling	D	.1286	.19048	....	...	....	...	no study		.1286	.19048	....	...	....	...	no study	
Steel, bar ⅜" to 1¼"—20' lengths	Gantry crane and magnet	A	.0204	.01415	....	...	....	...	no study, too dang.		.0204	.01415	....	...	....	...	no study, too dang.	
Steel blooms	Overhead crane and clamp	C	.6458	1.00448	....	...	....	...	no study, too dang.		no study		....	...	....	...	no study, too dang.	
Steel, firebox and flange	Half-gantry crane and cable	A	.2726	.16043	....	...	....	...	no study		no study		....	...	....	...	no study	
Steel, sheet ¼" x 44" x 120"	Locomotive crane and clamp	D	.3091	.41238	....	...	....	...	no study, too dang.	.2142	.30000	....	...	....	...	no study, too dang.		
Steel, sheet (boiler and structural)	Half-gantry crane and hooks	A	.2198	.12953	....	...	....	...	no study, too dang.	.2198	.12953	....	...	....	...	no study, too dang.		
Tires, driving	Overhead crane and hook	C	.3010	.25000	....	...	....	...	no study, too dang.	.3010	.25000	....	...	....	...	no study, too dang.		
Tires, locomotive	Overhead crane and sling	D	.5135	.61297	....	...	....	...	no study, too dang.	.1811	.22857	....	...	....	...	no study, too dang.		
do	Half-gantry crane and hooks	A	.1815	.10678	....	...	....	...	no study, too dang.	.1815	.10678	....	...	....	...	no study, too dang.		
Tires, trailer—42½"	Locomotive crane and magnet	C	.1086	.06912	.7348	87.1	1.8657	96.4	.8434	1.93480	no study		....	...	....	...	no study	
Track material, miscellaneous	Half-gantry crane and sling	A	.2167	.12723	....	...	....	...	no study		.2167	.12723	....	...	....	...	no study	
Tubes, boiler	Gantry crane and magnet	A	.0576	.04000	....	...	....	...	no study		.0576	.04000	....	...	....	...	no study	
do	Overhead crane and sling	C	.7061	1.21332	....	...	....	...	no study		.7061	1.21332	....	...	....	...	no study	
do	do	C	.6880	.58479	.1396	16.9	1.5161	72.2	.8276	2.10090	no study		....	...	....	...	no study	
do	do	A	.0333	.01777	....	...	....	...	no study		.0333	.01777	....	...	....	...	no study	
Valves, triple, freight car	Lift truck and skids[1]	A	.0150	.00983	....	...	....	...	no study, too dang.		.0150	.00983	....	...	....	...	no study, too dang.	
Wheels, car (loose)	Gantry crane and magnet	C	....	.....	....	...	....	...	.0334	.07400	no study		....	...	....	...	no loose wheels load'd	
do	Handled by hand on road studied	C	....	.....	....	...	....	...	.0840	.01449	no study		....	...	....	...	.0840	.01449
Wheels, car (mounted)	do	A	.3326	.19577	....	...	....	...	no study, too dang.		33.26	.19577	....	...	....	...	no study	
Wheels, car—rolled steel	Half-gantry crane and chains																	

[1] In skids when received. [2] Per pole. [3] Per 100 poles. [4] Per 1,000 board feet. [5] Loss.

worked rather than by the number of working hours in the year. The wage rates are basic rates paid the men actually engaged in the handling operations. In each time study the number of machine-hours used as the basis for apportioning costs is given so that estimates of costs of operation under other conditions, i. e., more or less hours of service per year, can be computed. No charges for insurance and taxes were applied in any studies.

It was difficult, if not impossible, for the roads to determine accurately the number of machine-hours trailers worked during 1933. Therefore, it was decided to determine the average number of machine-hours worked by all tractors on the road studied, and assume that each trailer worked the same average number of machine-hours.

As for skids, it was decided to use 2,080 machine-hours per year, as practically all skids were in some kind of service all the time. No one interviewed, including manufacturers and railroad stores officials, could show an accurate method for arriving at the necessary amount of overhead to be charged against skids used in these studies. Equipment such as tractors and trucks are released for other jobs when loading or unloading operations are completed, but skids remain in service. Therefore, it would not have been fair to charge overhead on skids on the basis of the actual time engaged in unloading or loading. A charge was set up for interest and depreciation per machine-hour, based on 2,080 machine-hours per skid. For every unloading or loading operation, one week of 40 machine-hours was charged against each skid. This means that when material is received, placed on skids and stored, a charge of 40 machine-hours is made against each skid used; that the same basis of charge is used when this material is transferred to another store, when the other store unloads it and places it in storage, and when the material is taken out of storage and delivered to the shop for use. For the whole series of operations, 4 weeks of 160 machine hours are charged against each skid. This method tends toward overcharging, but is considered fair under the circumstances.

The four roads studied were asked to prepare complete lists of all material-handling equipment on their systems as of January 1, 1934, used more than 50 per cent of the time by the stores departments. Detailed data requested on each machine included: Major specifications, such as make, size, rating, kind of power, and kind of tires; manufacturers' and railroads' serial numbers assigned to machines; location where last used; number of units of each kind and size of equipment, dates of purchase, and purchase costs f.o.b. lines; total years of expected life from date of purchase; amount of annual interest at 5 per cent, annual taxes, annual insurance, and annual depreciation based on total years of expected life; cost of operation in 1933; cost of maintenance in 1933, and machine-hours worked in 1933.

The items of taxes and insurance were omitted because it was impossible to include them and still effect true comparisons. Charges for electrical equipment include the cost of current consumed, but do not carry any overhead for charging panels and other charging equipment, nor any labor cost for charging batteries. The apparatus used for charging batteries is not included in the list of equipment, as it is often used for purposes other than that of charging batteries for stores mechanical handling equipment. All labor and material, repair and overhaul costs, all tires and tubes, lubricants, and other items such as alcohol and distilled water for batteries, are included. No operating or maintenance costs could be obtained for non-powered equipment, as no records were kept in the majority of cases. It was learned that on one road maintenance costs per trailer averaged $1.25 annually. Industrial users of steel skids have stated that the annual maintenance charges run about ½ of 1 per cent on the investment. The number of hours the machine was actually working was determined as accurately as possible for powered equipment, it could not be even estimated for non-powered equipment. Therefore, the average number of machine-hours worked by each tractor on each road was used arbitrarily as the average number of machine-hours worked by each trailer on that same road. Machine-hours for hand lift trucks and skids were set arbitrarily at 2,080 each for all roads. Depreciation and interest charges have been added to the cost of operation and maintenance, and the total figure divided by the number of machine-hours worked, to determine the average total cost per hour worked, or per machine-hour.

The average expected life of equipment based on present estimates, although appearing high in some cases, is amply supported by the actual average number of years already in service. For example, the average expected life of electric platform trucks is 19.19 years, and the recorded average age of this equipment in service is 9.5 years. In order to check these and other figures covering equipment used by railroads, the use of like equipment in other industries was investigated wherever possible. In the case of electric platform trucks, such investigation brought out information from a large industrial company which uses 58 of these trucks, averaging 14 years old, some having been in service from 15 to 22 years.

The estimated savings realized by Road D are shown. The year 1925 was selected as the starting point, as no substantial purchases of powered equipment had been made up to that time. From 1925 to 1929, equipment in the amount of $83,164 was purchased for the system. If the same volume of business had been done in 1925 as in 1929, with the equipment used in 1929, the net savings would have been $257,378.16. When this figure was determined, it was re-checked by the general storekeeper, who said, "The savings as exhibited, if anything lean largely to understating, in that the savings actually developed do not take into account the inter-shop delivery, and improved service to other departments due to handling material with modern equipment and facilities." One striking example of savings on this road was found in the handling of steel blooms. The old method of man handling cost $4.28 per 4,000 lb. bloom. The lift truck and skid method costs $0.29, showing a saving of 93.2 per cent. The saving on this item alone amounts to $239.40 monthly or $2,872.80 yearly, and includes only blooms delivered to the shops. The purchase and use of certain specific equipment by the same road saved 183.3 per cent annually on the investment. This includes savings made through "stores delivery," but it is unquestionably true that the use of the equipment alone returned a saving of more than 100 per cent annually on the investment.

Road A benefited by a 44.2 per cent annual net saving on a purchase of $31,644.77 in certain equipment.

Safety has an important bearing on the value of mechanical equipment for handling materials. Everyone who has had experience in handling materials, both by hand and mechanically, agrees that the use of mechanical equipment reduces the number of accidents. The stores officials of all roads studied have made statements to this effect. It is difficult to prove the extent of such reduction, but statistics are available which give weight to the above statement.

Exchangeable and Interchangeable Containers

Many roads are realizing substantial savings through the use of lift trucks and skid platforms, or "skids," for the handling of materials. This practice is confined largely to materials after they have been received from the manufacturer. In a very few instances, manufacturers load materials for shipment on skids which have been supplied and shipped by the purchasing road. This is now restricted to cases in which the manufacturer is located on the line of the purchasing road, and to those in which roads do their own manufacturing and load products on skids.

This method of handling as compared with hand handling shows net savings ranging from 48.3 per cent (driving springs) to 90.6 per cent (journal bearings). Fire brick is another of many items admirably adapted to skid and lift truck handling. When this material is placed on skids after being received from the manufacturer, the net saving on the first unloading operation over hand handling is 67.6 per cent. Further net savings of 25.3 per cent, making a total net savings of 92.9 per cent, would result if the material were received on skids from the manufacturer and handled with lift trucks.

Some roads engaged in the manufacture, reclamation, and repair of materials place skids in the shops where they are used as work benches. The raw or old material is removed from skids in one position and loaded on skids in another position. The movement of handling of material is thus integrated with the manufacturing and other processes, which results in substantial economy.

Extension of the practice of shipping materials on skids or other similar carrying units, from the manufacturer's plant to the using railroad, is hindered because of the cost to the road of shipping empty skids to the manufacturer. This cost is reflected in the investment tied up in skids, and in charges for shipping empty skids over a foreign line. The answer to this problem lies in the handling of loaded skids or other devices in all directions of traffic and over all railroads.

Many manufacturers now use skids or similar devices in the

inter- or intra-plant handling of their products. The extension of handling materials on skids and other carrying units to transportation by common carrier should result in savings to all concerned. The number of handlings would be materially reduced at both the point of shipment and the point of receipt, cars could be loaded, unloaded, and released more quickly, and many containers such as cartons, barrels, kegs, and boxes eliminated, thereby reducing packaging costs. The number of accidents incurred in handling operations should be reduced.

It should be possible and practicable to provide carrying units, and the mechanical devices to handle them, of standard types, sizes, and clearances which would fulfill normal conditions and requirements of service, and would enable interchangeable use of the carrying units. The division of simplified practice of the U. S. Department of Commerce has promulgated certain standard dimensions for skids which have been widely approved and used in many industries. Similar standards applied to design, construction, and quality would pave the way for the users of these handling devices to operate on a reciprocal or exchange basis. Invoices covering such transactions would be similar to those now generally used in connection with the interchange of drums, compressed gas tanks, reels, etc. Charges for damages and repairs would present no serious obstacle, for actual records show that maintenance of properly constructed "permanent" skids is about one-half of one per cent per annum.

Materials Handling Study by Each Road

While it has not been assumed that the roads included in this study are doing the best possible job of handling all kinds of material, it is believed that appreciable savings would result if all roads were to handle all materials with the degree of efficiency shown by the average performance of these roads. In the past, as at present, progress in this field has been seriously handicapped by the seeming impossibility of obtaining accurate costs. Without exact knowledge of the costs of operation and maintenance of equipment, average life of the equipment, and quantity of man-hours and money required for specific handling operations, no reliable estimates could be made to show what savings could be expected to result from the purchase and use of mechanical handling equipment. It seems probable that individual roads would find it profitable to study the methods and costs of materials handling at all stores points, individually and collectively. Such studies should develop facts on which to purchase and use such equipment as will produce maximum economy in performing all the necessary operations.

Roadways

No railroad stores department can handle materials as cheaply with poor roadways as with good roadways. Although this statement is accepted as an established fact, it is difficult to obtain figures showing annual savings in dollars and cents resulting from improved roadways. Tests have been made, with satisfactory results, but nowhere have quantitative figures been developed to prove that a definite amount of money expended to improve roadways, platform surfaces, etc., will result in a definite saving in handling operations. The safety factor is also important in appraising the value of such improvements.

Cost Records

Operation and maintenance costs for material-handling equipment are not kept on a comparable basis by roads which maintain such records. This necessitates careful study of all conditions and circumstances, before any useful comparisons can be made. Records of the equipment itself, such as capacity, kind of power, date of purchase, purchase price, and location where used, are not immediately available, nor are they always reliable and accurate. The fact that stores expense accounts cannot be used for comparing the efficiency of different stores operations has been brought out in numerous reports.

The labor cost chargeable to handling materials is more than 75 per cent of the total stores payroll, and should be subject to analysis by groups of roads which are operating on a fairly comparable basis. Private industries, with an investment in material-handling equipment no larger than that of the railroads, find it advisable to maintain complete and accurate cost records on such equipment. In addition to knowing what it costs to operate and maintain the equipment, such records are useful in determining whether a piece of equipment should be overhauled or some other disposition made of it, whether later models are enough more efficient to justify scrapping or trading in old ones, and, when future purchases are considered, whether one type, capacity, or make, is performing better service than another. The development of standard forms for accounting for equipment costs should prove of great benefit by making available a sounder basis upon which to compare costs.

Problems of Truck Regulation*

By Joseph B. Eastman†

IT was a great pleasure to me that finally we were able to reach a substantial agreement with the American Trucking Associations as to what should be done, and the result was the motor carrier act. If it had not been for the support of the associations, I do not believe it would now be law. If I may say so, also, I feel sure that the support was wise and that you will have no cause to regret it.

The Interstate Commerce Commission appreciates to the full the great responsibility which rests upon it in the administration of this new law, and is under no illusions as to the magnitude and difficulty of the undertaking. As yet we are still in the process of building up our organization for the work.

A New Departure in Commission Organization

Motor transportation differs in so many ways from rail transportation that it would take a fair sized volume to enumerate them all. The commission has been in existence for nearly a half century, and during all of that time it has had to do chiefly with railroads, although it has also had considerable experience with water carriers and pipe lines and some experience with telephone and telegraph companies. The established bureaus of the commission are headed by men of whom we are proud. They are men of integrity and capacity, who play no favorites. But these men have had little occasion to become well acquainted with motor transportation. It was evident to us that in the administration of the motor carrier act we would need the help of men who were thoroughly acquainted with that form of transportation and all of its peculiarities and intricacies. On further reflection we were convinced that we could not get the most and the best out of these men if they were distributed around among the existing bureaus, reporting to men whose experience lay in other fields and whose time was already fully occupied with other duties. We decided, therefore, upon a new departure in commission organization, namely, to create a Bureau of Motor Carriers which would render assistance to the commission in all phases of its regulatory work under the motor carrier act.

By so doing, we felt that we could avoid any danger that this regulatory work would be colored or affected by customs or habits of thought gained from experience with the railroads and which might not be well suited to the very different conditions of motor transportation. This danger was not, in my judgment, as great as you and others on the outside may have thought, for the heads of our older bureaus are not set in their ways nor unaccustomed to dealing with new problems. Yet it was a danger, and one that we could avoid. We also felt that if these men with experience in motor transportation were concentrated in one bureau, they could be of very great help to each other.

One possible objection to such a bureau, handling a

* From an address before the American Trucking Association, Inc., at Chicago, Ill., October 14, 1935.

† Member, Interstate Commerce Commission.

wide variety of work, is that it places a very heavy burden upon its director. We believe, however, that we have met that objection in the man whom we have selected to fill this position. Mr. Rogers is a man with a sound, level head, highly industrious and steady under fire. He is modest but firm, he knows what he is doing, and he knows how to work with others. As for the other key men, we have tried, without regard to politics or any other extraneous consideration, to get the best men we could find. In general, they have not sought us but we have sought them. A prerequisite has been experience which would qualify them fully for the particular work which they would be called upon to do. We have favored men comparatively young in years, and we have endeavored to pick men who have a real desire to serve their country and can be depended upon to do their duty without fear or favor.

The same principles will be followed, with the help of civil service examinations, in building up the organization units which these men are to captain. You are aware, I suppose, that we have labored under a handicap in our organization work. The funds for the administration of the motor carrier act were to be supplied in the so-called deficiency appropriation bill. It passed the House, but failed to pass the Senate because of a filibuster at the eleventh hour. We have now been given authority to draw on the general funds of the commission until February 1, but until the first of October we were unable to put a single man on the payroll of the new bureau.

Another reason for the single bureau, handling all regulatory functions under the motor carrier act, deserves particular mention because it brings up another very important point. One very vital difference between rail transportation and motor transportation is that the former is conducted, for the most part, by large and well-organized carriers, whereas the latter is carried on by a great multitude of operators who are in general very small and many of whom have their organizations under their hats. Federal regulation, if it is to be successful, must be adapted to the necessity of these little operators. It must meet them more than half way. It must not be stiff-necked and rigid, but accommodating and helpful, so far as the law permits.

Because of this situation, we have felt it necessary to have an extensive field organization covering the entire country, and officered by men of initiative and discretion with knowledge of all the fundamentals of our regulation, men who can deal with these operators on the ground and not only police them but advise and help them in every feasible way, working at the same time in close co-operation with the state authorities who handle motor carrier and motor vehicle matters.

The Bureau of Motor Carriers will report to a division of the commission of which I am chairman for the time being, other members being Commissioners Lee and Caskie. That division will deal initially with all motor carrier matters, subject, of course, to the power of review which lies in the commission as a whole.

The form of organization which we have adopted and the men we are selecting for that organization will, we believe, enable us to regulate motor transportation, as the act directs, with regard to its "inherent natural advantages," in other words, to adapt our regulation to the nature and characteristics of this particular form of transportation and not some other kind. There are, however, some possible misunderstandings that I ought to caution you against.

The fact that we have set up a separate bureau and have created a single division of the commission for this motor carrier work does not mean that it is divorced from the other work of the commission. The division is only a division. It is not a separate and independent commission. The ultimate power and authority is in the hands of the Interstate Commerce Commission, of which the division is only a part, and it is the entire commission which will have the final say on all basic questions. Last winter I advocated an enlargement and reorganization of the commission which would in effect have departmentalized it under central control for the handling of railroad regulation, motor carrier regulation, water carrier regulation, and even air carrier regulation. Such a reorganization would have required an act of Congress, and that act was not passed. I still believe that some such reorganization will be desirable, particularly if the commission is given full authority over water carriers and air carriers. However, I also believe that under its present set-up the commission has, by the creation of the new bureau and the new division, adopted the best form of organization now possible for the administration of the motor carrier act, and along with the other commissioners I shall do everything in my power to make it a success.

The Rate Question

It should also be made clear that we do not intend the new Bureau of Motor Carriers to operate either in a vacuum or as a water-tight compartment. What the country wants and ought to have is the best possible system of transportation, and successful regulation of transportation is impossible unless we see the picture in its entirety and consider the whole as well as the parts. All the forms of transportation are interrelated; it is impossible to escape that fact. Motor carriers have for some years been attacking railroad rates from time to time and asking us to prevent or control changes in such rates. Rail carriers will most assuredly ask us to exercise our authority in one way or another over motor carrier rates as soon as they get a chance. The same thing will happen in the case of certificates and permits. All of these questions have got to be considered in their relation to one another and with an eye to the best transportation interests of the country.

We shall expect our Bureau of Motor Carriers to keep in touch with the older bureaus of the commission and vice versa, and we shall see to it that they all consult and advise with each other on matters of mutual interest and importance. The commission has the same concern for all the forms of transportation. It is in a way the father of them all, and it is its duty to deal fairly and impartially with each and every one of them, within the limits of its power and jurisdiction. That is what it intends to do to the best of its wisdom and ability. We can see to it that we are fully informed in regard to the characteristics and potentialities of each form of transportation and its ability to serve the public, and that we do nothing which tends to deprive it of its inherent natural advantages and its opportunity to develop.

Another point on which there may be misunderstanding is this: We realize the need in regulation for direct and prompt action, for cutting what is called red tape, for avoiding long delays in making essential decisions. Nevertheless, a public regulatory body cannot deal with all matters with the same degree of freedom as a private business enterprise. It cannot be arbitrary. It must follow the dictates of the statutes which govern its action, and be able to prove in court, if need be, that it has done so. In general this means that in controverted matters it must give all interested parties a fair hearing and be able to back up its acts by a definite record of the facts. To put it in another way, a commission like ours is not a dictator, but a quasi-judicial body responsible in law to higher authority, and it must act

and protect its acts accordingly. At times the procedure which this entails is vexatious to all concerned, and not least of all to the commission. We can do a good deal to shorten and simplify that procedure, but we cannot avoid it. In the long run it is the only sure protection against arbitrary or unprincipled or unjust action. If a tribunal has to tell why it does things and point to a record which supports its action, it cannot go far wrong and survive.

Let me give you one or two illustrations of what I have in mind. There seems to be a division of opinion among the motor truck carriers as to whether, in making their charges, they should use corresponding railroad rates as a guide or be governed by the cost of their own operations plus a fair profit. Some would like the commission to decide this question for them before tariffs are filed. The commission could not fairly and lawfully make such a decision without giving a full hearing to all concerned, and there are many difficult questions which would have to be considered at such a hearing, including what is meant by cost and how it is to be determined. Moreover, the act does not contemplate that the commission shall initiate rates, but only that it shall regulate them. The initial tariffs may be filed as the motor carriers may see fit, subject to the rules and regulations which the commission will issue to govern the manner in which the rates shall be stated and published.

Cost May Become Dominant Factor in Rate Making

These initial rates, to be filed when the rate portion of the act takes effect, cannot be suspended by the commission, but they will be filed with the knowledge and understanding that they may thereafter be changed by the commission, after appropriate proceedings, if it finds them unlawful in any respect under the provisions of the act. In other words, when you file your rates, you must take the risk that you can defend them if they are attacked, just as the railroads do. In the event of an attack, the act makes it clear that the commission must give all due consideration to cost of service, and my own guess is that it will eventually be the dominant factor in fixing rates, if only because many shippers will truck their own freight if your charges go much above cost of service. Yet there are many things to be considered in connection with costs. For instance, there is such a thing as out-of-pocket cost, which is much less than full cost. If any form of transportation is allowed to make competitive rates on the basis of out-of-pocket cost, there is no escape from the conclusion that all forms of transportation must be allowed the same privilege. I can see that issue looming up, and it will be of vital importance. Whatever decision is reached will have far-reaching consequences.

Some operators have told me that they would like to have the commission determine what regulations it will prescribe with respect to hours of service of employees and what its requirements will be with respect to surety bonds, insurance, and the like before they are called upon to file their rates. Those are matters which must be considered with the greatest of care before final conclusions are reached, and I am sure that you want us to consider them with such care. In all probability hearings will be necessary. We shall proceed on these matters with the utmost expedition that is practicable, but no one can be sure how long a time will be required, and it seems plain to me that we cannot tie up the filing of rates with such uncertainties. They will have an important bearing on the rates to be charged, but so will many other changing conditions.

We now are issuing application blanks to be filled out and filed for certificates and permits under the so-called "grandfather clause." It may seem to you that we are calling for considerable information on those blanks and they may seem, at first glance, rather formidable. I believe that on second glance you will not find them so difficult. We have tried to make them as simple as possible, and to ask only for the information which it is essential under the law for us to have before we can issue the certificate or permit. There may be as many as 250,000 of them, and we know that questions will arise and checks will be necessary in the case of many. If there should prove to be about that number and we were able to deal with them at an average rate of 800 per working day, which I think you will agree is a very high rate, it would still take nearly a year to dispose of them. However, under the law the rights of all operators who have their applications on file are protected until they are acted upon, one way or the other.

When a new law like this is passed, it is always found that there are many provisions which require interpretation. Circumstances and situations develop which were not clearly foreseen when the language was drafted and which it does not fit as well as might be desired. It is surprising, also, how often it is found that language which was carefully considered and thought to have a perfectly clear meaning is in fact capable of two or more possible constructions. Sometimes it may not have been as carefully considered as it should have been and this is particularly apt to be true of amendments which are introduced in haste on the floor of Congress. A large number of such questions have already arisen and have been brought to our attention. We shall deal with them as quickly as possible, but I should tell you that the commission from long experience has found it dangerous to make ex parte rulings on legal questions which may later arise in litigated cases. We shall have to safeguard any provisional rulings with a good deal of care, but we shall try to handle these matters with sound judgment and with as little inconvenience as possible to the carriers and others who may be concerned.

You must be patient with us in getting the administration of this new act under way. Regulation of the railroads has been a slow growth over many years attended by much litigation and a gradual development of the statutes. The idea seems to prevail today in some quarters that it is a new, surprising, and significant thing that the constitutionality of acts of Congress should be brought into question. The law books are full of cases in which the constitutionality of provisions of the interstate commerce act has been put to the test. Even the transportation act, 1920, which emanated from the strongholds of conservatism, was so questioned in various important respects. Fortunately we had all this background of controversy, litigation, and slow development to help us in framing the motor carrier act, and it is much more of a full-fledged product than any prior railroad legislation. But this fact in itself makes the task of the commission all the more difficult in plunging into its administration. In addition, the motor carrier industry is new and chaotic and in the stage of development where it is full of vagaries and almost incredibly complex, in some of its aspects.

We shall tame this wild new job and get it in hand, but do not expect a 100 per cent performance all at once. In the process of learning we shall make mistakes, and we shall be slower in many ways, no doubt, than you would like. Criticize us when you think we need it, for criticism is good for the soul of a public servant, but don't forget that we shall have many trials and tribulations on our own account and many difficulties to surmount.

Electric Work on the Railways

Air conditioning, diesel power, welding add to duties of electrical specialists and enhance importance of their activities

THE twenty-fourth annual convention of the Association of Railway Electrical Engineers was held in Chicago, at the Hotel LaSalle, October 9 and 10. All of the time available during the two days was given to consideration of the nine reports presented. The Railway Electrical Supply Manufacturers Association did not hold an exhibit, but its members attended the convention in force to follow the discussion, which was concerned largely with the many changes now taking place in the electrical field. A summary of the reports and of the discussion follows:

Illumination

The consumption of train-lighting lamps increased during 1934, the first upturn in several years. The total annual consumption for the year ending May 31, 1930, was 2,750,000 lamps. For the year ending December 1, 1933, the demand had decreased to 1,870,000, or 32 per cent. For the year ending December 31, 1934, the demand was 2,066,000, an increase of 11 per cent over the previous year. This trend is pointed out by the committee on illumination. Other subjects included in the report are gaseous conductor lamps, shock-absorbing devices for headlight lamps and car lighting. It is suggested that high-intensity mercury-vapor or sodium lamps be considered for high-bay shop lighting and other applications where the color of the light is not objectionable, and where it is not necessary frequently to turn the light on and off. These lamps produce almost twice as much illumination per watt as the most efficient incandescent lamps.

On one railroad during the year 1933, shock-absorbing devices were used on steam-passenger locomotives, with the result that lamp mileage for all steam equipment was increased 25 per cent. In the year 1934, during which freight and switching locomotives were being equipped, the lamp mileage was increased to 152 per cent of the average for six unequipped years. This increase in lamp mileage resulted in a saving during 1933 and 1934 of approximately 13,000 lamps or nearly $12,000 (double the cost of shock-absorbing devices).

The committee is especially concerned with the subject of car lighting because of the difficulties involved in lighting cars with low ceilings, the inefficiency of indirect lighting, the demand for higher intensity illumination and the limited amount of power available. Various suggestions for improving lighting made by the report leaves the reader with the impression that much work is still to be done to meet present-day lighting demands.

Discussion—In presenting the report, G. T. Johnson, assistant electrical engineer, New Haven, stated that the highlights of the report were those parts dealing with (1) the sodium lamp, (2) shock absorbing devices and (3) carlighting.

G. W. Bebout, electrical engineer, Chesapeak & Ohio, recalled a situation of a few years ago in which improved headlight lamps were under discussion. He said that, in his experience, he had found the C5A lamp to be better than the C4 or the C5, but that he had recently received a shipment including some C4 lamps. H. H. Helmbright, railway lighting, General Electric Company, stated that C5A lamps in the future would be manufactured to the exclusion of the C4 and C5.

In response to questions raised concerning the application of Lumiline lamps, L. T. Verbarg, superintendent of power plants, Missouri Pacific, stated that the Texas & Pacific now has 11 coaches completely lighted by means of these lamps. Heretofore, they have been used largely for decorative purposes. C. R. Gilman, car lighting engineer, C., M., St. P. & P., added that the Milwaukee was using a combination of direct and indirect lighting for low ceiling cars which provided from eight to ten foot candles by means of Lumiline lamps.

The high intensity mercury lamps have now been developed so that they will operate down to a temperature of 10 degrees below zero. This information was offered by Mr. Helmbright. C. R. Stover, electrical engineer, General Electric Company, said that because of their high efficiency, these lamps were being used successfully in body finishing plants where the high-intensity lighting needed could be supplied by these lamps with much less heat than was produced by incandescent lamps.

A general discussion followed which covered lamp voltages and lamp efficiencies and required levels of illumination, particularly as applied to passenger cars.

Purchase of Electric Energy

The manner in which certain clauses of power contracts may change materially the cost of power under various conditions of load and service are outlined by the committee on purchase of electrical energy. The committee recommends: (1) Close co-operation between departments in checking rates and schedules; (2) that all contracts and rate schedules pass through one department, to avoid the possibility of obtaining the wrong rate or schedule; (3) close co-operation with lighting companies and a frequent study of the rates and schedules of these companies, in order to take advantage of changes benefiting the consumer; (4) consolidation of facilities where it is possible without impairing the service or increasing the cost by excessive carrying charges on the required installation; (5) an analysis of the rate structure for the purpose of developing the best means for supplying power used for servicing and and charging air-conditioned cars. The committee also suggests that contracts of long duration should be avoided.

Discussion—The report was presented by G. T. Johnson who said that little data on the subject was available but was greatly desired since large savings can be made by selection of the most suitable contracts and avoidance of conditions which create penalties.

C. G. Winslow, supervisor, electric light and power, Michigan Central, suggested that power supply companies might be induced to give a single rate to railroads which included a number of power sources. In discussing this point, it was brought out that most power companies state that this practice is outside the limits of practice as allowed by regulatory bodies. It was also said, however, that the power companies were now much more inclined to be lenient with special contracts or contract conditions. L. G. Conklin, general electrical inspector, Delaware & Hudson, supported this by stat-

ing that his company had a contract on the basis of which power could be purchased at a straight energy rate or a demand plus energy rate, depending on which method of calculation allowed the smaller charge.

The value of power limiting devices to prevent excessive peak loads was discussed, and it was stated that on practically any railroad one man can easily earn his salary by watching electrical power expenses which would otherwise go unnoticed.

Power Plants

Diesel engines received practically all of the attention of the committee on power plants. Modern Diesels, the report states, show a fuel consumption ranging from .38 pounds to .43 pounds of fuel per horsepower hour with fuel containing 19,500 B.t.u. per pound. This corresponds to a thermal efficiency of from 30 to 35 per cent. Attention is called to various engine improvements, such as the enclosing of moving parts, greater accessibility, the reduction of weight per horsepower to 22 pounds, an improved air distribution known as a "back flow scavenging," and a sensitive fly-ball governor for controlling engine speed.

Discussion—The report was presented by L. J. Verbarg. G. T. Johnson expressed the opinion that the committee should work up comparative costs of different means of producing power. This was generally agreed to, but so also was the fact that few railroads have records showing the cost of the power they produce. It was, however, agreed that if a shop had a demand for process steam or considerable steam-heating load, a railroad power plant for the shop is usually justified. Mr. Johnson said that while he concurred in general with this thought, he felt that insufficient attention was given to means other than the use of live steam for drafting locomotives.

Railway Automotive Equipment

The report of the committee on railway automotive equipment is chiefly concerned with working out gear ratios for the motor drives of Diesel-electric motor cars and locomotives. A set of curves is included to show that the actual hours or minutes operation of the engine is greatly reduced when the gear ratio matches the requirements of the train schedule.

Discussion—R. G. Gage, chief electrical engineer, Canadian National, stated that item 3 of the recommendations for future work, covering the study of various control systems for electrical transmissions was, in his opinion, of greatest importance among the several items listed for next year's study. One type of control system, he said, will be more effective and more economical, than another depending upon the class of service in which the car or locomotive is used. In response to a question concerning what mileage Diesel-electric rail cars were operated between shoppings, Mr. Gage replied that on the Canadian National, they are trying to get 200,000 miles and have approached this figure.

G. T. Johnson spoke of trouble experienced on the New Haven in the starting of Diesel engines in cold weather. In reply to this, Mr. Gage stated they do not leave their Diesel locomotives standing idle out-of-doors in cold weather.

Car Electrical Equipment

A summary of air-conditioned cars in service September 1, 1935, is included in the report of the committee on car electrical equipment. This summary shows a total of 760 steam-ejector systems, 1,987 ice-activated systems and 3,191 compressor-type systems in service, making a total of 5,796 air-conditioned cars. The greater part of the report deals with inspection requirements of these three air-conditioning systems. Certain inspections and tests are recommended for each type of equipment, respectively, at the completion of each trip, at 15-day intervals and at 30-day intervals.

Practically all of the air-conditioned cars receive electrical power for the operation of air-conditioning equipment or for the operation of air-conditioning auxiliaries from axle-driven generators. Attention is called to the fact that during the past year there has been a decided trend toward a combination gear box and belt drive. One Canadian road has recently introduced a new application which consists of a combination flat belt and chain pulley. During the summer the flat belt is applied and the chain removed, while during the winter months the chain is reapplied.

Air-conditioning requirements have necessitated the use of larger storage batteries and high rates of discharge. To meet the changed requirements, the committee has developed a revised form of storage-battery guarantee, and a revised method for capacity rating.

One hundred and ten-volt systems for air-conditioned cars have recently received serious attention. They are used on the Norfolk & Western, and the report includes an outline of how the system has been employed and with what success on that railroad. This report lists many advantages of the high-voltage power supply.

Discussion—The report was presented by Geo. W. Wall, foreman electrician, Delaware, Lackawanna & Western, with the assistance of L. T. Verbarg who covered the section dealing with air conditioning.

J. E. Gardner, electrical engineer, Chicago, Burlington & Quincy, stated that the purpose of air conditioning is to get business, that it is here to stay and that installed equipment must be designed and applied with this in mind. He said it was necessary to make a further study of capacities of equipment used and that much was still to be learned about control of temperature and humidity.

Replying to a question by E. S. M. Macnab, car lighting engineer, Canadian Pacific, Mr. Verbarg stated that on long trains equipped with steam ejector equipment, metallic connectors and not hose connectors are used between cars.

Concerning required steam pressures listed in the report, A. E. Voight, car lighting and air conditioning engineer, Santa Fe, said that these pressures are satisfactory for 10-car trains but that 180 to 190 pounds is necessary for a 14-car train. Lesser pressures, he said, were required for precooling since the steam can be connected near the center of the train and distributed in both directions. Mr. Verbarg stated that the steam-jet equipment will operate over wider ranges than those recommended in the report but that the recommendations were made with the idea of obtaining as high as possible an efficiency of operation.

Following a discussion of the inspection periods recommended in the report, Mr. Bebout stated that these methods have been applied on the Chesapeake & Ohio, with the result that they have had less than one-tenth of one per cent failures, and that while it was formerly necessary for maintainers to ride cars, this was no longer required.

G. T. Johnson expressed the opinion that the reports should go further in the study of yard equipment for servicing air-conditioned cars.

A large part of the discussion centered around the subject of make-up or fresh air taken into the cars, and the elimination of odors within the car. L. J. Verbarg stated that it is the tendency to use as much outside air as the capacity of the equipment will stand but added that settings which are supposed to bring in

25 per cent make-up air frequently only allow 10 per cent. It was generally agreed that exhaust fans in toilets and control lockers were desirable. Taking the accumulated heat out of the control lockers reduces load on the equipment and an exhaust fan and makes the air circulation in an otherwise tight car more uniform.

F. J. Hill, electrical engineer, New York Central, stated that no deodorant is satisfactory for removing the great variety of odors which accumulate in a car. He said that the best method consisted of cleaning cooling coils and filters, and of bringing in an adequate supply of fresh air.

A. E. Voigt called attention to the need for keeping a slight positive pressure inside the car, particularly in dusty country. If too much exhaust draft is used, he said it will allow dust to be drawn into the car.

It was generally agreed that coil-type filters are more satisfactory than the dry type, and that it was necessary periodically to clean thoroughly filters, cooling coils and ducts. A Sellers cleaning gun for cleaning locomotives was recommended for cleaning cooling coils.

The question of winter air condition as compared with winter heat was raised by J. A. Cooper, assistant electrical engineer, Wabash. Members of the association seemed disinclined to deal with this subject because of the difficulties involved in obtaining a satisfactory humidity control. George Kohfeldt, electrician, Missouri-Kansas-Texas, however, stated that humidity control of both the automatic and manual type had proved quite satisfactory on a number of M-K-T trains. He said too high humidity was easily avoided because steaming of the windows made it apparent.

There was evidently much interest among members in the subject of 110-volt power supply for passenger cars but lack of time made it impossible for the association to discuss this subject.

Electric Welding Equipment

The report of the committee on electric welding equipment lists about 200 applications of welding which can be used advantageously in railroad practice. Special attention is called to the introduction of automatic welding as applied to the construction of passenger cars on the Chicago, Milwaukee, St. Paul & Pacific, and the possible uses of atomic-hydrogen welding in railroad work are outlined. The latter process lends itself admirably to the welding of relatively thin sections and the joining of dissimilar metals. The report also states that electric welding sets are now being made in sizes from 100 amp. to 600 amp. and that the 300-amp. single operator set appears to be the most popular size for general railroad work.

Welding electrodes have been greatly improved in recent years, and the committee feels that an improvement in welding and a great reduction in the number of failed welds could be effected if more consideration were given to the selection of electrodes for each application.

The methods of inspection of electric welds on most railroads are confined essentially to a visual inspection after the weld is made. The report calls attention to improvements effected on one railroad by periodic tests of welding operators.

Discussion—Following the presentation of the report information on welding electrodes was requested. A. M. Candy, consulting engineer, Hollup Corporation, replied that development of electrodes is now progressing at such a rapid rate that it is a difficult subject to cover. He said he was glad to see alternating-current welding covered by the report, and suggested certain precautions. He said an electrode, which may work well on direct current may not be satisfactory for alternating current. He also stated that high open circuit voltages, which cause annoying shocks to operators and reduce welding efficiency can be avoided by the use of devices which keep these voltages down to 30 volts, actually less than that of direct-current machines.

Locomotive Electrical Equipment

Prefocused headlight lamps are discussed in some detail in the report of the committee on locomotive electrical equipment. Drawings are included to show suggested forms of mounting the reflector and the prefocus socket. The drawings also show a means for including a shock-absorbing pad with the pre-focus socket.

The latter part of the report deals with cab signal train-control and train-stop equipment. Recent improvements in the mounting of apparatus are outlined. There is a large drawing to show the circuits used for the coded system of cab signals on electric locomotives operating in multiple unit. Other drawings show means for providing satisfactory power-supply systems, respectively for a.c. mu. single-unit cars, for double-unit a.c. mu. cars and for a.c. electric locomotives.

Means have been provided for making fully-automatic and semi-automatic departure tests of cab-signal systems in busy terminals. In the latter case, the test is initiated by a push button, and the various codes are automatically selected in proper sequence for the complete test. In the former case, the test is initiated when the wayside signal track relay is released by the train. A complete test requires about 30 sec. with trains at times on a 90 sec. headway.

Discussion—The report was presented by C. W. Nelson, superintendent of train control and electrical equipment, Chesapeake & Ohio. He said that the latter part of the report pertaining to train control was presented only as information, and the discussion was limited to the subject of insulated copper wire for locomotives. The suggestion was made made that the present minimum standards for this wire be raised. Members, however, were agreed that wire delivered under present specifications was highly satisfactory and expressed the opinion that they should not be changed since they in no way restrict the development of better wire.

Motors and Control

The report of the committee on motors and control deals essentially with power for welding generators, the protection of welding generators and crane motors and the use of thermal relays. Three-phase, 220-volt power, delivered to the motor through four-conductor portable cable, of which one wire is grounded, is recommended for electric motor-generator welding sets. Idling devices for engine-driven welders are recommended so that the engine may run at reduced speed when no welding is being done. Thermal overload protection is recommended for welding generators, particularly when the capacity of the driving motor is greater than that of the generator. They are also recommended for motors on shop cranes, and it is suggested that they be located where they are subject to the same surrounding temperature as the motor. A thermostat attached to the frame of a water pump, the report states, has been found effective in stopping the motor in cases of low water or where the foot valve becomes inoperative.

Discussion—The report was presented by C. G. Winslow, supervisor electric light and power, Michigan Central. He was asked why the report recommended that thermal relays protecting three-phase motors should be set at 15 per cent full load instead of 25 per cent and replied that this was done to provide the motor with

greater protection. In response to a question concerning the burning out of motors due to single-phasing, Mr. Winslow replied that a thermal relay properly applied should open all three phases.

Election of Officers

A.R.E.E. officers elected to serve during the coming year were as follows: President, R. E. Gallagher, electrical engineer, Louisville & Nashville; first vice-president, George T. Johnson, assistant electrical engineer, New York, New Haven & Hartford; second vice-president, T. W. Wigton, assistant electrical engineer, Chicago, Burlington & Quincy; secretary-treasurer, J. A. Andreucetti, assistant electrical engineer, Chicago & North Western; members of the executive committee, C. P. Kahler, electrical engineer, Union Pacific; G. W. Wall, electrical foreman, Delaware, Lackawanna & Western.

The dinner of the Railway Electrical Pioneers Club was held at the Hotel LaSalle on the evening of October 9. Officers of the club elected to serve during the coming year are as follows: Chairman, Godfrey H. Atkin, Electric Storage Battery Company; chairman memorial committee, J. A. Andreucetti, assistant electrical engineer, Chicago & North Western; chairman nominating committee, Carl Pinyerd, Safety Car Heating & Lighting Company; secretary-treasurer, Otis B. Duncan, Electric Products Company; chairman membership committee, L. C. Hensel, Peerless Equipment Company.

At the A.R.E.E.-R.E.S.M.A. dinner held on October 10, J. A. Andreucetti was presented with a silver service in recognition of his having served 25 years as secretary-treasurer of the A.R.E.E.

A business meeting was held by the Railway Electrical Supply Manufacturers Association on October 9. The following slate of officers was elected to serve during the coming year: President, C. B. Harlow, Benjamin Electric Manufacturing Company; Senior vice-president, R. I. Baird, Electric Storage Battery Company; junior vice-president, A. S. Anderson, Adams & Westlake Company; secretary-treasurer, Edward Wray, Railroad Purchases and Stores; Members of executive committee, A. M. Anderson, Gould Storage Battery Company; W. A. Ross, Pyle-National Company, W. F. Hruby, Simplex Wire & Cable Company.

Fire Protection Association Holds Meeting at Baltimore

(*Continued from page 496*)

sion of this subject revealed a difference of opinion as to the value of spacing stored cars to minimize fire hazards. All evidently agreed that in small yards or sidings, spacing between each 10 cars is desirable. Some, however, held that when a large storage yard is attacked by fire it is more desirable to have the cars coupled so as to permit a locomotive to haul out the largest possible number with one movement.

Other reports were presented by committees on: Freight Car Heaters and Refrigerator Cars; Incinerators; Merchandise in Transit—Explosives and Other Dangerous Articles; Stations, Freight Depots and Warehouses; and Locomotive Fire Hazards. Also R.F.P.A. representatives presented reports of the N.F.P.A. committees on dust explosions in grain elevators, gases and arson laws; and of the A.R.E.A. committee on rules for fire prevention as applied to the maintenance of way department.

Odds and Ends . . .

Believe It or Not

The Norfolk & Western vouches for this one. A little girl on one of their air-conditioned trains, on a blistering hot afternoon, looked out of the window and remarked: "Those boys out there certainly picked a cool day for swimming."

Big Bill Egan

The recent celebration of the 25th anniversary of the Pennsylvania Station in New York also marked a double celebration for William (Big Bill) Egan, who has been its stationmaster ever since it was built, and, in addition, has 50 years' service with the Pennsylvania to his credit.

A Real Railroader

When John Coolidge, son of the late President Calvin Coolidge, decided to be a railroader most people viewed it as a passing fancy. He has, however, just completed seven years' service with the New York, New Haven & Hartford at New Haven, which certainly qualifies him as a railroader.

Rebel Hostesses

The Gulf, Mobile & Northern is doing things in style in connection with the operation of its new streamlined "Rebel." Three hostesses, the Misses Kathryn Sullivan, Ruby Paulk and Catherine Shell, have been appointed to ride each trip of the trains to see that all passengers feel themselves the welcome guests of the railroad.

New Commander

Norman A. Ryan, assistant general manager of the Chicago, Milwaukee, St. Paul & Pacific, was accompanied to Milwaukee by more than 200 legionnaires recently, on the occasion of his installation as commander of Milwaukee Road Post No. 18 of the American Legion. Mr. Ryan served as lieutenant with the 16th Railway Engineers during the war.

A Standing Item

It has become such a regular thing for members of the Delaware & Hudson police to win shooting prizes that such accomplishments are hardly news any more. Just recently, the team went to Providence, R. I., to compete with the best in the East, and came away with first team prize, plus a bushel of medals for individual efforts.

Italian Is a Soft Language

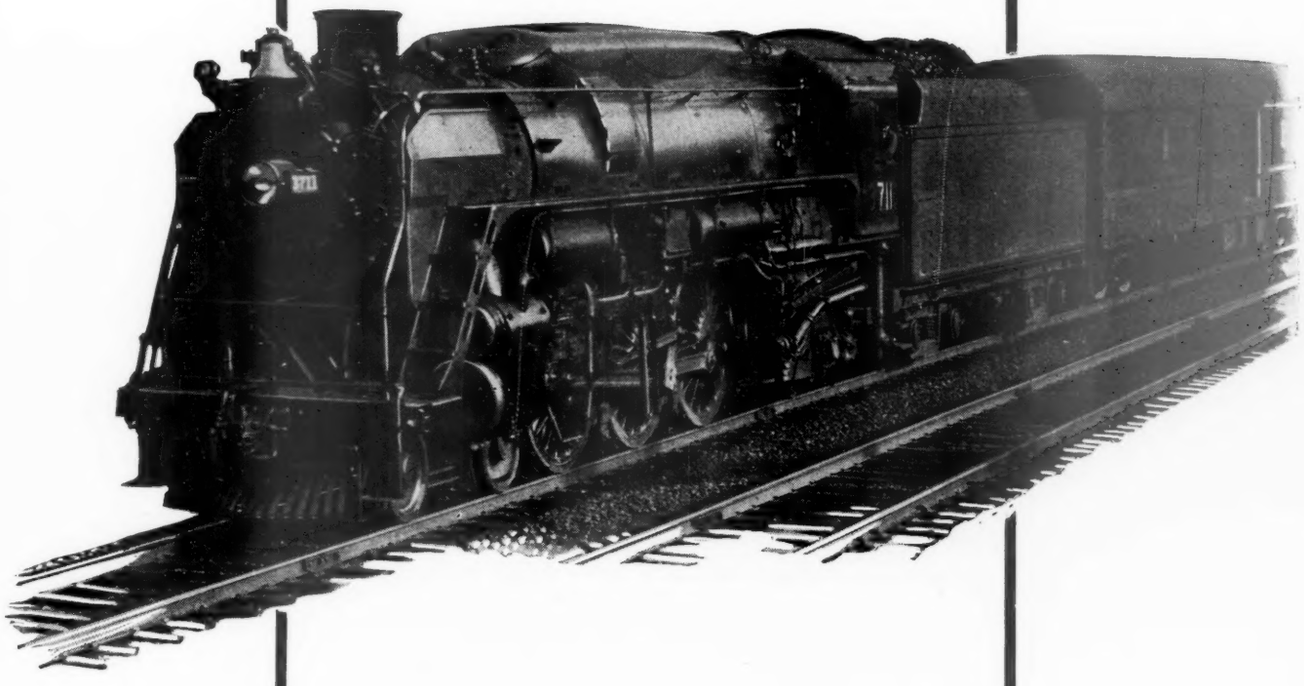
A despondent cow apparently attempted suicide by lying down on the New York Central tracks near Troy, N. Y. Four policemen, summoned to the scene, vainly tried to move her with shoves, halters, tow-ropes, and words both kind and harsh. Finally the owner, Rachel Camorata, arrived, addressed the cow in soothing Italian, and the animal sighed, rose and was led away.

Diamond Jim

The current movie under the above title, featuring the life of "Diamond Jim" Brady, master railway supply salesman of the nineties and the early years of the present century, is somewhat over-supplied with errors and contains the usual movie hokum. Although it purports to have been taken from the recenly published and excellent biography of Diamond Jim, the fertile movie imaginations permitted a rather wide straying from the text and from the actual life of their subject. Despite all this, however, Edward Arnold does extremely well with the leading role, and, if one is not too critical of facts as compared to fancies, the movie provides excellent entertainment of an hour or two for either the railroad or the supply man.

News Department begins on next left-hand page

MODERN POWER
Lowers ton-mile costs
Increases Net Earnings



Ability of the motive power to move cars at the lowest possible cost determines the net earnings of the railroad. « « Modern locomotives, as compared with units built ten or more years ago, are capable of increasing the gross-ton-miles per train hour by 25 to 30 per cent. « « This increased output spreads operating costs over greater tonnage and shows correspondingly increased net earnings.

LIMA LOCOMOTIVE WORKS INCORPORATED

LIMA LOCOMOTIVE WORKS, INCORPORATED, LIMA, OHIO

NEWS

I.C.C. Now Scrutinizing Background of Trustees

Courts' appointees have to answer questions as if applying for civil service jobs

The Interstate Commerce Commission has taken steps to inform itself as to the qualifications of men appointed by the federal courts as trustees for railroads that have come under the bankruptcy statute for the purpose of compliance with a provision in the amendments to Section 77 of the law approved on August 27 that appointments by the courts "shall become effective upon ratification thereof by the commission without a hearing, unless the commission shall deem a hearing necessary." This takes the place of the plan of appointing trustees from a panel.

A question as to the validity of this provision was raised by Federal Judge James H. Wilkerson at Chicago recently in connection with the proceedings as to the Chicago, Rock Island & Pacific, but the commission has sent questionnaires to several men already appointed by different courts, and on October 7 it adopted rules of procedure setting forth the information as to such appointees which is to be furnished by the debtor or the appointee in a petition asking that the appointment be ratified. Information in response to the questionnaire had already been furnished by Thomas M. Schumacher, Charles Elsey and Sidney M. Ehrman, appointed trustees for the Western Pacific, and Charles P. Megan, appointed trustee for the Chicago & North Western. Mr. Megan's appointment was ratified by the commission on October 15. The order calls for the following:

(a) Date and place of birth.

(b) Education.

(c) All past principal occupations and period covered by each.

(d) All present occupations and intentions with respect to continuation thereof during service as trustee.

(e) Whether or not the appointee, within one year of the date of his appointment, has been an officer, director, or employee of the debtor corporation, any subsidiary corporation, or any holding company connected therewith.

(f) All present business relations, connections, or affiliations, of any character, either direct or indirect, with any individuals, partnerships, associations, corporations, or other organizations, and all such relations, connections, or affiliations of such individuals, corporations, or organizations, with the debtor or any of its affiliated interests.

(g) Any and all financial interests of the appointee, either direct or indirect, in any individual, partnership, association, corporation, or other organization. This statement should contain a complete list showing the kind and amount of all holdings, direct or indirect, beneficial or otherwise, by the appointee or any member of his immediate family, of stock certificates, notes, bonds, or other securities issued or guaranteed by such individual partnership, association or corporation.

(h) Any and all direct or indirect, fixed or contingent, financial obligations of the appointee, owing to or held by any individual, partnership, association or corporation, whether as creditor, surety, or financial backer of the appointee, or as obligee, holder, or beneficiary of such obligation. This statement should show the kind and amount of each obligation, and the name of the creditor, surety, financial backer, obligee, holder or beneficiary.

No Passengers Killed in Train Accidents

The notable feature of the I. C. C. accident record for the six months ending with June, 1935, is the item "passengers killed in train accidents," which is blank; none killed throughout the six months; and this is the third time within the past four years that this perfect record has been made for the half year, January-June. J. J. Pelley, president of the Association of American Railroads, in a statement calling attention to this fact, says that the passenger traffic of these six months was the largest since the corresponding period of 1931, aggregating 8,600,000,000 passenger-miles; an increase of 22.7 per cent over the low level of the first half of 1933. The present record is equivalent to transporting one passenger around the world 344,000 times without fatal injury.

Fatalities to railroad trainmen in train accidents in the first six months of 1935 numbered 28, compared with 42 in the corresponding period last year.

Caspar W. Haines Dies

Caspar Wistar Haines, retired civil engineer, who, a number of years ago, was identified with several railroad construction projects in this country, Mexico and Central America, died in Germantown, Pa., on October 12. He was 82 years old.

Truckers Hear Details Of Regulatory Plans

Rogers promises decentralization-civil service examinations for all field forces

The new legislation provided by the Motor Carrier Act supplied the principal topic of discussion at the second annual convention of the American Trucking Associations at Chicago, on October 14 and 15. Three of the principal speakers built their addresses around this legislation; namely, Joseph B. Eastman, Federal Coordinator of Transportation and chairman of the Motor Carrier Division of the Interstate Commerce Commission; John L. Rogers, director, Bureau of Motor Carriers, Interstate Commerce Commission, and L. F. Orr, chairman, highway transportation committee, National Industrial Traffic League, who spoke on the shippers' interest in motor truck regulation.

Mr. Eastman's address is published in abstract elsewhere in this issue. Mr. Rogers stressed the fact that the new Bureau of Motor Carriers is an unbiased body, which has no leanings toward any particular form of transportation and will be kept on a just, fair basis. He traced the difficulties of financing the body, in view of the failure of Congress to pass a bill providing for the necessary funds, and stated that the general funds of the Interstate Commerce Commission, not specifically earmarked, are being used to carry the bureau until Congress passes the necessary financing bill at its next session. Despite the fact that everything was in readiness for an early start on highway transport regulation, funds were not made available to the bureau until October 1, which has necessarily hampered the work.

He announced that Division V would be decentralized as much as possible for the benefit of the operators and to avoid their having to take all sorts of matters up with Washington. It is planned to have 16 district offices, whose territories have not yet been definitely fixed, but whose headquarters will be at the centers of motor transportation. Each of these field offices will be in charge of a district agent. The organization will also contain a joint board agent, whose duties will be largely those of a contact man between the field forces and the joint boards set up under the Act. Each office will contain one or more accountants, and one or more rate and tariff experts, whose sole function will be to aid the operators in the solution of their problems. A number of supervisors will also

Continued on next left-hand page

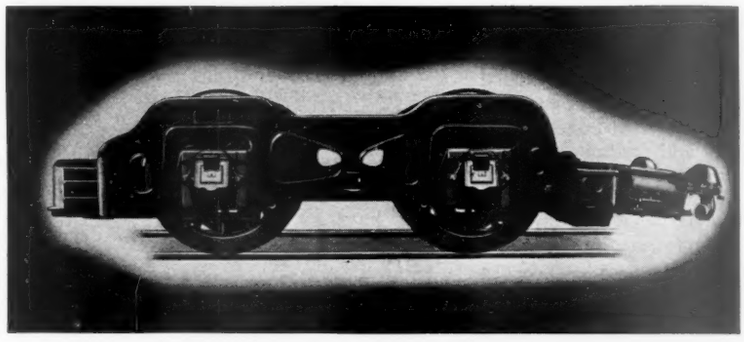
BALANCED POWER *cuts* FUEL COSTS

Locomotive cylinders correctly proportioned for road speeds, with the extra power needed for starting and accelerating provided by the Locomotive Booster, insure a power unit of maximum fuel economy and minimum maintenance.

A motive power unit such as this is properly balanced as to power required for both road speeds and starting ranges.

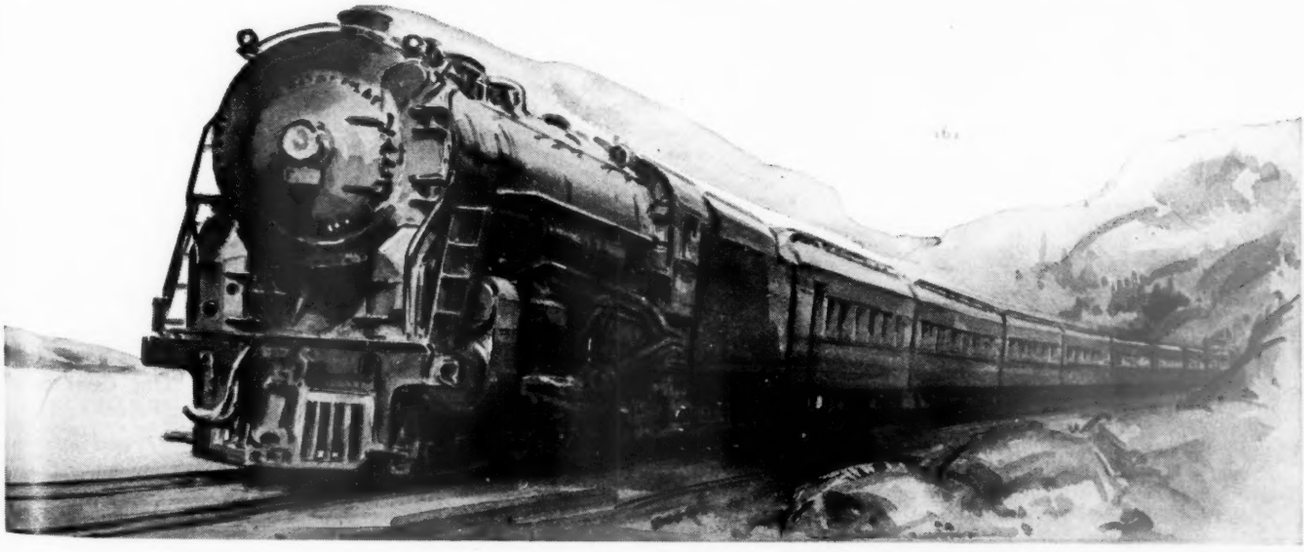
It permits of a lighter unit that is working at its maximum fuel efficiency all of the time it is hauling its train.

This fuel efficiency is available in any locomotive whether for heavy freight or light high speed service.



Franklin parts fit—In applying them there is no labor cost for fitting. They are built to original dimensions of carefully selected materials—they avoid road failures and excessive maintenance.

FRANKLIN RAILWAY SUPPLY COMPANY, Inc.
NEW YORK CHICAGO MONTREAL



be appointed to help the operators in the carrying out of the rules and regulations.

It is not planned, Mr. Rogers said, to use these supervisors as a ruthless police force. Rather, they will attempt to conduct their supervision on a fair, business-like basis. Civil service examinations for every position in the field force will be held within the next ten days, and the entire personnel of the field forces will be selected on a strictly civil service basis without favoritism.

The central bureau in Washington will consist of nine sections, as follows: certificates and insurance; rates and tariffs; accounts; statistics; complaints; research; safety; finance; and legal. Mr. Rogers also described briefly the new application blanks and other forms already issued by the bureau. A complete description of these forms will appear in the Motor Transport Section of next week's issue of the *Railway Age*.

The proposed rules and regulations, Mr. Rogers stated, will not be promulgated on an arbitrary basis. A tentative draft will be set up in each case by the bureau officers in charge. These drafts will then be submitted to all interested for criticism and suggestions. These in turn will be considered before the final draft is arrived at and made effective.

Rates under regulation were also discussed at length by committees and in the open meeting. Since, however, these rates are to be decided upon by the Interstate Commerce Commission, only suggestions can be made at this time by the motor truck operators, and these, of course, will be given full attention by the Commission.

President Ted V. Rodgers was re-elected to that office for another term and announced that a total of 250,000 applications for certificates and permits under the "grandfather clause" might be expected under the new Act.

The annual banquet was addressed by the Hon. Harold S. Hoffman, governor of New Jersey, who spoke on the importance of highway transportation to the nation.

Eastern Car Foreman's Association

The next meeting of the Eastern Car Foreman's Association will be held on Friday, October 25, at 8 p.m. in the Engineering Societies building, 29 West 39th street, New York. At this meeting a paper will be presented on the New York, New Haven & Hartford's new streamlined train, the Comet, by K. Cartwright, mechanical engineer of the New Haven.

I. C. C. to Investigate Montana State Rates

On petition of the railroads the Interstate Commerce Commission has ordered an investigation as to the effect on interstate commerce of the failure of the Board of Railroad Commissioners of the State of Montana to authorize or permit increases in intrastate rates corresponding to the emergency increases in interstate authorized by the federal commission in Ex Parte No. 115.

Thefts in Colorado Bring Arrests

As the result of a six-months investigation into a series of thefts from box cars in Colorado, six men have been arrested and charged with the burglaries, while three Boulder (Colo.) business men have been arrested on charges of receiving the stolen goods. During the last six months it is estimated that merchandise valued at approximately $3,500 has been stolen from cars of the Colorado & Southern and the Denver & Rio Grande Western.

Traveling Passenger Agents

At the annual meeting of the American Association of Traveling Passenger Agents at Denver, Colo., on October 7-8, the following officers were elected for the ensuing year: President, Leonard J. Pohlman, traveling passenger agent of the Canadian Pacific, at New York; vice-president, D. B. Steeg, district passenger agent of the Pennsylvania, at Kansas City, and secretary, Charles A. Melin, general eastern passenger agent of the New York, Chicago & St. Louis, at New York, re-elected.

"Mark Twain" Runs to Twin Cities

The "Mark Twain," the Chicago, Burlington & Quincy's newest "Zephyr," which is to be placed in service between St. Louis, Mo., and Burlington, Ia., was operated from Chicago to the Twin Cities and return on October 13, covering the 882 miles in 12 hours. On October 14, the train was taken to the shops at West Burlington, where the baggage car will be removed temporarily to prepare for speed trials at McCook, Neb., in conjunction with the Republican Valley jubilee.

Railroad Employment in September

Class I railroads (excluding switching and terminal companies) reported to the Interstate Commerce Commission a total of 1,008,576 employees as of the middle of September. This represents a decrease of 0.96 per cent as compared with the number in September, 1934, and of 0.24 per cent as compared with August, 1935. Employees in the train and engine service showed an increase of 2.34 per cent as compared with August but a decrease of 1.3 per cent as compared with September, 1934.

Opposes Motor Truck Rates Based on Rail Rates

The Shippers Conference Committee of the St. Louis (Mo.) Chamber of Commerce has adopted a resolution in opposition to proposals for basing motor truck tariffs on railroad tariffs. The resolution holds that such a rate basis would be "contrary to the declared policy of Congress" as expressed in the Motor Carrier Act, 1935, and pledges itself to exert "our every effort to influence the adoption of rates and classification by the trucks, wholly independent of and without any relationship whatsoever to rail rates and classification."

N. I. T. L. Asks Rehearing in Terminal Allowances Case

The National Industrial Traffic League has filed with the Interstate Commerce Commission a petition for a rehearing in Part 2 of Ex Parte No. 104, the terminal allowances case, stating that the commission's decision was fundamentally wrong because it did not recognize "the universal custom and legal obligation of the railroad carriers under which established carload freight rates cover the complete service of transportation from loading places to places of final unloading" and because it imposes "an indefinite, impractical and illogical test" as to the carrier's obligation in car placement. It is also stated that the decision will mean the "establishment of a visionary and impractical scheme of spotting charges."

Senate Committee Probes A. A. R.

Investigation for the sub-committee of the Senate committee on interstate commerce, of which Senator Wheeler is chairman, appointed to conduct an investigation under a Senate resolution into the financial affairs of the railroads, have started a study of the files and records of the Association of American Railroads, to determine what use has been made of the dues paid by member roads. Counsel for the committee are also engaged at the Interstate Commerce Commission offices in studying the financial records and history of several railroads in a list made up under the provisions of the resolution by Co-Ordinator Eastman but it is understood that no hearings will be held until perhaps about the first of the year.

Seek Funds to Administer Pension Act

Although nearly two months have now elapsed since the passage by Congress of the railroad pension act and the accompanying tax law intended to provide the necessary funds, no appointments have yet been announced by President Roosevelt of the members either of the Railroad Retirement Board which is to administer the proposed pension system or of the special commission which was to make a study of the subject and report to the President and Congress by January 1 "respecting desirable provisions for a sound retirement and annuity system." Because of the failure of the third deficiency bill no appropriation for the expenses of either the board or of the commission was made by Congress and so far no money has been made available for the purpose. Following conferences on the subject Co-ordinator Eastman, who has also been making an investigation of the subject of railroad pensions, has applied for an allotment of $100,000 of federal relief funds for the purpose of the studies to be made by the board, but the time for the study to be made by the special commission has already been so greatly curtailed as to reduce the probability of its being able to recommend a substitute plan which might be put through Congress before the tax feature of the law becomes effective on March 1.

Mr. Eastman's organization is also expected to report on some plan to be applied to the railroad industry as a substitute for the unemployment insurance feature of the social security law, which becomes effective on January 1.

B. & M. Extends "One-Cent Sale" Passenger Fares

Extension of its sale of one-cent return-trip tickets, so that the innovation of round-trip tickets for one cent plus the one-way fare will be available for rides

Continued on next left-hand page

This EXPERIENCE *has a definite value!*

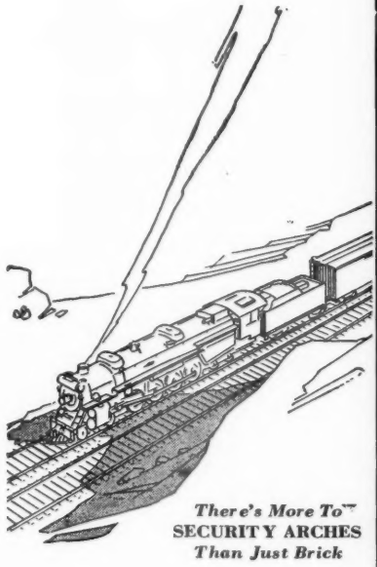
●

AN ENGINE DOES NOT STEAM SATISFACTORILY, or perhaps the fuel consumption is high, or it may be one of a score of troubles involving locomotive combustion.

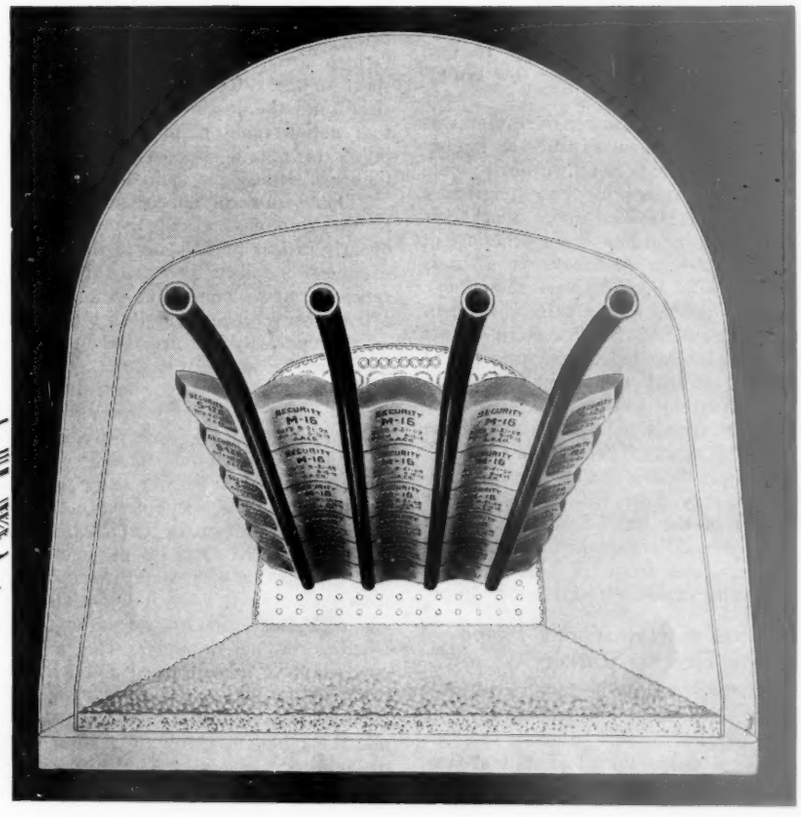
THE CALL GOES OUT FOR AN AMERICAN ARCH Company service engineer. From his years of experience he quickly gets at the source of trouble and aids in correcting it.

ROADS SERVED BY THE AMERICAN ARCH COMPANY have their Arch Brick supply backed by a service organization that has spent lifetimes on the one problem of improving locomotive combustion.

THIS EXPERIENCE HAS A DEFINITE VALUE

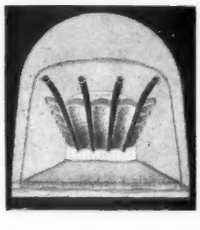


There's More To SECURITY ARCHES *Than Just Brick*



HARBISON-WALKER REFRACTORIES CO.

Refractory Specialists



AMERICAN ARCH CO.
INCORPORATED

Locomotive Combustion Specialists » » »

to and from some 30 Massachusetts north shore stations, as well as between Boston and north shore points, has been announced by the Boston & Maine. Schedules of the additional reductions in fares, filed with the Massachusetts Public Utilities Commission October 14, became effective October 17.

"As in the case of the original 'one-cent sale,'" said Vice President John W. Rimmer, in charge of traffic, "this is simply an experiment and, as I stated when the original one-cent ticket idea was announced, we hope it will be so successful in attracting more traffic to the rails that we can continue it."

D. D. Conn to Address Richmond Traffic Club

Donald D. Conn, executive vice-president of the Transportation Association of America, will be the speaker at the Richmond (Va.) Traffic Club's next monthly meeting, which will be held at the Hotel John Marshall in that city on October 21. Mr. Conn's subject will be "Government Ownership of Railroads."

Low Rates to Coast Continued

The traffic executives of the eastern railroads at a meeting in New York on October 16 concurred in a proposal of the trans-continental roads to extend until May 31, 1936, the experimental reduced rates which had been made effective from Pacific Coast northwestern territory to Eastern destinations and which expire by limitation on November 30, 1935.

At the same meeting consideration was given to a readjustment of rates on lumber from Southern and Southwestern points which initial carriers in those territories regard as necessary in order that their producers may continue the marketing of lumber in Eastern territory on a basis competitive with Pacific Coast shippers.

While the details of the rate adjustment from Southern and Southwestern points were not finally concluded, concurrence was given in a general reduction which had been submitted by initial lines, to expire concurrently with the reduced basis from the Pacific Coast. The measure of the reduction from Southern and Southwestern points will vary from that which obtains in the case of the Pacific Coast reduction because of the difference in the method of constructing rates from the several origin groups to the various destination points.

Benefits of New York's Inland Freight Station

Savings to New York shippers of over $1,000,000 in three years are credited by the Port of New York Authority to Manhattan's first union inland freight station, which is located in the Port Authority Commerce building, 111 Eighth avenue. A summarized report of the operations at the inland station was issued by Frank C. Ferguson, chairman of the Port of New York Authority, as the station entered upon its fourth year this week.

"In the first year of the station's operation," Mr. Ferguson said, "90,000,000 lb. were handled; in the second year 130,000,000 lb., and in the third year nearly 140,000,000, or a gain of 55 per cent. In the three years, 252,000 shippers' trucks used the station for 1,160,000 individual shipments over the railroads serving the Port of New York. Each truck carried an average load of over 1,233 lb., with each shipment averaging 268 lb. The average truck therefore forwarded 4.6 shipments. Without the station, this would mean 4.6 separate dumps instead of the one station dump. The saving between 4.6 dumps and one dump, at as little as twenty minutes, amounts to a saving of an hour and twelve minutes for each truck. It therefore can be pointed out that in the three years of union inland station operations there has been a total saving of 302,400 trucking hours, or at the prevailing cost of truck, chauffeur, and helper, a saving to the shipping public of $1,007,000."

I. C. C. Asks Better Support of Fourth and Sixth Section Applications

The Interstate Commerce Commission has issued a notice to all carriers calling for prompt improvement in the filing of applications for relief from the long-and-short-haul provisions of the fourth section of the interstate commerce act and those of the sixth section of the act relating to tariff schedules which the railroads desire to put into effect on short notice. The notice says that the instructions contained in the commission's rules governing these applications are definite and complete, but that applications are being received in increasing number "which are so vague and general in respect to the rates proposed, the relief desired, and the justification for such relief, that action upon them is necessarily delayed to obtain further information or they are denied for lack of jurisdiction."

"This results in unnecessary work both to the commission and the carriers, frequently in loss of revenue to the latter due to their inability promptly to establish rates to meet competitive conditions, and often inconvenience and losses to shippers who temporarily are deprived of the benefit of the proposed rates.

"Many applications contain little other than a rough draft of the schedule which it is proposed to file, such draft consisting of anywhere from one to 200 pages, and being arranged in such manner that it is unintelligible without reference to other schedules. Failure to explain the basis for the proposed rates, to set forth clearly the justification for such rates, together with an adequate comparison of the present with the proposed rates, or to show whether or not interests who might be opposed have been notified and what their position is, all contribute to delays in passing upon applications. Frequently applications under section 6 request waiver of statutory notice, the only justification offered for short notice being that the carrier has been requested by some shipper to make such application. Applicants should definitely describe the emergency which prompts the application and show why the rate was not filed on statutory notice. Often applications refer to tariffs, other applications, or other documents for information pertinent to such applications. Generally, all such information should be included in the application itself. In the rare cases where reference to some other document is really necessary, such reference should be specific by page or item."

120 Grade Crossing Projects Approved

Announcement was made this week by the Bureau of Public Roads that plans for 120 grade crossing projects at a cost of $8,717,050 have been approved under the $200,000,000 program provided for this purpose in the federal works program and that contracts have been awarded for 41 of these projects at a cost of $2,478,864. Announcement also was made that the President had approved complete or partial programs for the states of Rhode Island, Washington, and the District of Columbia. Programs for Michigan and Alabama had been approved previously. The bureau statement included the following table showing the status of grade crossing projects as of October 12:

State	Approved	Contracts awarded During week	Contracts awarded To date
Alabama	$1,359,000	.....	$582,327
Arizona	.....	.....	.....
Arkansas	268,000	.....	98,000
California	37,000	.....	.....
Colorado	236,000	.....	.....
Connecticut	.....	.....	.....
Delaware	.....	.....	.....
District of Columbia	.....	.....	.....
Florida	317,000	.....	.....
Georgia	.....	.....	.....
Hawaii	.....	.....	.....
Idaho	78,000	.....	52,000
Illinois	67,000	.....	.....
Indiana	619,000	.....	.....
Iowa	693,000	$352,909	372,112
Kansas	.....	.....	.....
Kentucky	562,000	.....	.....
Louisiana	.....	.....	.....
Maine	.....	.....	.....
Maryland	.....	.....	.....
Massachusetts	.....	.....	.....
Michigan	1,543,050	.....	838,135
Minnesota	.....	.....	.....
Mississippi	.....	.....	.....
Missouri	.....	.....	.....
Montana	323,000	.....	.....
Nebraska	316,000	.....	.....
Nevada	153,000	.....	.....
New Hampshire	.....	.....	.....
New Jersey	.....	.....	.....
New Mexico	143,000	.....	.....
New York	.....	.....	.....
North Carolina	424,000	.....	.....
North Dakota	50,000	.....	39,400
Ohio	.....	.....	.....
Oklahoma	433,000	59,000	159,000
Oregon	40,000	33,000	33,000
Pennsylvania	.....	.....	.....
Rhode Island	.....	.....	.....
South Carolina	134,000	54,467	54,467
South Dakota	48,000	.....	.....
Tennessee	83,000	.....	.....
Texas	101,000	.....	59,000
Utah	162,000	.....	26,000
Vermont	.....	.....	.....
Virginia	.....	.....	.....
Washington	41,000	.....	.....
West Virginia	.....	.....	.....
Wisconsin	427,000	.....	116,000
Wyoming	60,000	.....	49,423
Total	$8,717,050	$499,376	$2,478,864

The President has approved a program submitted by the Department of Public Works of Rhode Island involving $699,691 of the fund previously apportioned by the Secretary of Agriculture. This allotment covers the entire amount earmarked to the state from the $200,000,000 funds set aside for grade crossing projects in the 48 states. The funds are to be applied to two projects on the federal-aid highway system outside of municipalities, involving the elimination of railroad grade crossings by the construction of grade separation structures at an estimated cost of $244,691; one project within the municipality of Providence on extension of federal-aid highway system involving the elimination of railroad grade crossings by construction of grade separa-

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Caution!

The walls of superheater units are exposed to the intensely hot gases from the firebox. They are kept within safe metal temperatures, however, by the transfer of the heat of the gases to the steam as it flows through the units at high velocities. Any appreciable retarding of the steam flow reduces the rate of heat transfer and naturally builds up an unsafe metal temperature. This will eventually cause superheater unit failures and may result in engine failure.

Superheater units should have smooth surfaces throughout their length. Joints introduce restrictions . . . exterior ridges on superheater units obstruct the drafting of the locomotive, while interior ridges restrict steam flow and reduce heat transfer.

When units become unserviceable after years of service, send them to us for REmanufacture. The cost is about half that of new units and they are returned to you like new. They are processed by the same men and machinery as are used in making new units . . . they are re-forged with smooth tubular surfaces, free from joints and attendant restrictions.

An interesting booklet describes the Elesco unit REmanufacturing service . . . write for a copy today.

THE SUPERHEATER COMPANY

Representative of AMERICAN THROTTLE COMPANY, Inc.

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NEW YORK

ELESCO

Peoples Gas Building
CHICAGO

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Canada: The Superheater Company, Limited, Montreal

Superheaters - Feed Water Heaters - Exhaust Steam Injectors - Superheater Pyrometers - American Throttles

tion structures at an estimated cost of $280,000; two projects on secondary or feeder roads outside of municipalities, involving the elimination of railroad grade crossings by the construction of grade separation structures at an estimated cost of $175,000.

The President has approved a program submitted by the Department of Highways of the State of Washington involving $1,382,300 of the funds previously apportioned. As the total apportionment to Washington is $3,095,041, there remains a balance of $1,712,741 to be covered by later programs.

The allocations are to be applied to five projects on federal-aid highway system outside of municipalities involving the reconstruction of one existing overcrossing, the construction of two new overcrossings, and the elimination of two other grade crossings by building underpasses, at a total estimated cost of $359,800; six projects on secondary or feeder roads outside of municipalities, one of which involves the reconstruction of an existing undercrossing, another construction of a new undercrossing, two new overcrossings, and two projects entailing the installation of crossing signal devices, for a total estimated cost of $278,400; and three projects within municipalities not on extensions of the federal-aid system, two involving reconstruction of existing overcrossings and the third construction of a new overcrossing, for a total estimated cost of $744,100.

The President has approved a program submitted by the commissioners of the District of Columbia, involving $220,000 of the funds previously apportioned. As the total apportionment to the District of Columbia is $410,804, there remains a balance of $190,804 to be covered by later programs.

The President has also approved programs submitted by state authorities, amounting to $420,000 in Idaho, $1,579,000 in North Carolina, $1,084,000 in Florida, and $723,000 in Montana.

Acetylene Association Convention

The International Acetylene Association will hold its thirty-sixth annual convention at the Hotel Cleveland, Cleveland, Ohio, on November 12-15. The opening session will be addressed by Dr. W. E. Wickenden, president of Case School of Applied Science, Cleveland, and the "keynote" address will be delivered by Merle Thorpe, editor of Nation's Business, Washington, D. C. The session on Tuesday afternoon will be devoted to safety. On Tuesday evening, an industrial motion picture, "Profits of Progress," will be presented in the Civic Auditorium. Wednesday afternoon will be devoted to the consideration of the metallurgy of welding and cutting.

The session on Friday afternoon will be devoted to transportation and will be presided over by Geo. D. Brooke, vice-president, C. & O.-N. Y. C. & St. L., with the following papers: Maintenance of Way Problems in High Speed Transportation, by Armstrong Chinn, chief engineer, Alton, Chicago; Oxy-Acetylene Process in Maintenance of Way Work, by L. J. Turner, chief rail inspector, C. R. I. & P., Chicago; Shape Cutting of Locomotive and Car Parts, by James Grant, superintendent motive power, A. C. L., Waycross, Ga.; Economic Advantages of the Oxy-Acetylene Process to Railroads, by George Durham, vice-president, W. & L. E., Cleveland. The discussion will be led by Elmer T. Howson, vice-president and western editor, *Railway Age*, Chicago, and B. F. Kuhn, assistant superintendent motive power, N. Y. C., Cleveland.

Railroads Will Repay Government Loans, Says J. M. Davis

The railroad industry, which encountered "little or no difficulty" in repaying its post-war indebtedness to the government should, with continued business improvement, be in a like position with respect to currently-outstanding obligations, said J. M. Davis, president of the Delaware, Lackawanna & Western, in a recent address before the Hoboken (N. J.) Chamber of Commerce. Thus did Mr. Davis reply to "misguided people" who criticize the railroads and favor public ownership on the theory that the carriers can entertain no hope of ever liquidating their present indebtedness to the government.

The speaker pointed out that government ownership was advocated "as long ago as the close of the Civil War" but he does not believe that "the American people have any intention of sanctioning the purchase of our railroad systems by the government as long as our present constitutional form of government endures." If the railroads were purchased, Mr. Davis pointed out, the national debt would be nearly doubled—at a time when "the American people wonder how funds are to be obtained with which to pay existing taxes."

In advocating equalization of taxes of railroads and their competitors Mr. Davis brought this problem home to his Hoboken audience, saying:

"Hoboken has observed the development, during recent years, of formidable transportation services that are competing with unregulated freedom with railroad terminal and ferry facilities. I have never considered that it was business-like for New Jersey to spend millions of dollars upon a great, non-taxpaying aerial highway over which trucks and bus loads of persons may be hurried out of the state. Needless to say that this system which enables people to pass by Hoboken and its neighboring communities with such rapidity retards your local business, consequently it deprives residents of your communities of employment.

"Had the state adopted a schedule of tolls for the use of this facility, and thus provided for the self-liquidation of the cost, the taxpayers ultimately would have been relieved of that financial burden. Such improvements provide unfair competition with the railroads for the further reason that they are not required to pay taxes, while, as you know, the railroads are the largest payers of taxes. It seems, therefore, that it would be fair and just if a method were to be devised which would provide equalization of the taxes of railroads and of railroad competitors, so that both will be upon a comparable basis and that the charges for services performed would be more nearly upon a parity."

Equipment and Supplies

LOCOMOTIVES

THE CANADIAN PACIFIC has ordered from the Montreal Locomotive Works five 4-4-4 type locomotives. These locomotives will be partially streamlined and are to be used in passenger service with trains of light-weight equipment, order for which was recently placed with the National Steel Car Company, Hamilton, Ont.

PASSENGER CARS

THE NATIONAL OF MEXICO is inquiring for 10 express and 10 mail and express cars to be of all-steel construction, 70 ft. long.

IRON AND STEEL

THE NEW YORK CENTRAL is inquiring for 3,000 tons of steel for use on its West Side improvements between Thirty-fourth and Forty-second streets, New York City.

NEW YORK CENTRAL.—William M. Ballard, Inc., who has the contract for erecting a service building for this road at Syracuse, N. Y. has given to the Shoemaker Bridge Company an order for 315 tons of steel to be used in that structure.

STATEN ISLAND RAPID TRANSIT—This B. & O. subsidiary has given a contract for about 400 tons of steel for use in connection with grade crossing elimination work on the Stapleton-Tompkinsville section, Staten Island, N. Y., to the McClintic-Marshall Corporation.

MISCELLANEOUS

THE GOULD STORAGE BATTERY CORPORATION, Depew, N. Y., is giving consideration to the installation of a Diesel engine generator set of 1,000 kw. capacity, to supply power requirements for storage battery operation.

Construction

ST. LOUIS SOUTHWESTERN.—This road has asked the United States War Department to approve a plan for the construction of two 210-ft. fixed spans to replace a 428-ft. draw span in a bridge across the Arkansas river near Rob Roy, Ark., the old structure being too light to carry modern motive power. The draw span that is to be replaced has not functioned as a movable span since 1911, when a new draw span was constructed at another point in the bridge.

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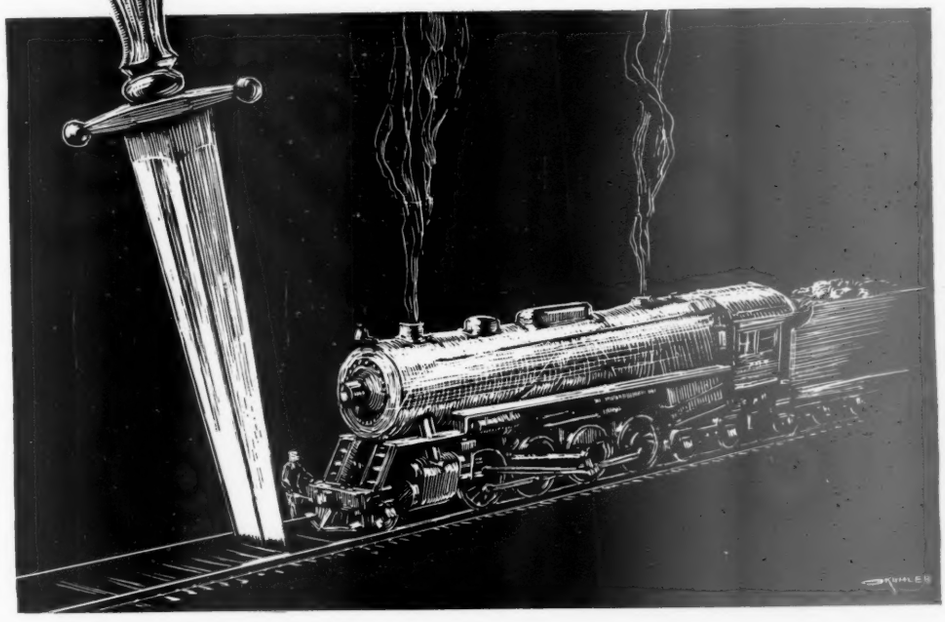
STABBED AGAIN!



AMERICAN LOCOMOTIVE COMPANY

SEVERAL roads, of late, have been handling all their freight traffic at practically passenger train speed with big wheel modern freight locomotives. Many of these modern locomotives are making 12,000 miles and more per month. The operating ratio is just about as low as it is possible to make it. . . But traffic increases. More locomotives are needed. So some of the older locomotives are called out of storage. . . When these older locomotives get out on the road, how long will it be until the modern locomotive runs up against a red signal? And when the block goes clear, how far or how fast can the modern locomotive go until it is "STABBED" again? . . . Isn't it a fact that the mileage per month of the modern locomotives will get less and less. They will cost just as much, if not more, to operate as before, but more and more every day, their earning power will approach nearer and nearer to the earning power of the older locomotives, all depending on just how many of the older locomotives are put in service. . . Certainly, more traffic will be handled — but will the net return be anywhere nearly commensurate to the amount of increased business? . . . Handling an increasing volume of traffic is one thing — and is only a question of number of locomotives. Handling the same increasing volume of traffic at a commensurate profit is something else again — it is a question of number of modern locomotives.

30 CHURCH STREET · NEW YORK · N·Y·

ALCO

Financial

CAMBRIA & INDIANA.—*Bonds.*—This company has applied to the Interstate Commerce Commission for authority to issue and sell $1,300,000 of first mortgage 3½ per cent bonds for the purpose of retiring an issue of 4½ per cent bonds.

CHICAGO & NORTH WESTERN.—*Abandonment.*—This company has applied to the Interstate Commerce Commission for authority to abandon a branch line of 4.75 miles from Rib Falls Junction in Marathon county, Wis.

CHICAGO & NORTH WESTERN.—*Abandonment.*—This company has applied to the Interstate Commerce Commission for authority to abandon a branch line from Stambaugh, Mich., to Steger, 6.8 miles.

CHICAGO, GREAT WESTERN.—*Trustees Named.*—Patrick H. Joyce, president of this company, and Luther M. Walker, an attorney of Chicago, were appointed co-trustees of this road on October 15 by Federal Judge Charles E. Woodward, sitting at Chicago.

CHICAGO, ROCK ISLAND & PACIFIC.—*Abandonment.*—The trustees have applied to the Interstate Commerce Commission for authority to abandon a branch line from Seneca to Langham, Ill.

DALLES & SOUTHERN.—*Abandonment.*—The Interstate Commerce Commission has authorized this company to abandon, as to interstate and foreign commerce, its entire line extending from The Dalles, Ore., easterly and southerly to Friend, 41.8 miles.

MAINE CENTRAL.—*Refunding.*—Changes have been made in the plans for refunding $20,000,000 of this company's bonds which mature on December 1, by which the plan has the approval of a committee representing savings banks and insurance companies holding approximately 50 per cent of the outstanding bonds. Under the new plan, $3,000,000 of 6 per cent collateral trust bonds are to remain outstanding, with their present collateral and present rate of interest. The general mortgage bonds, series A, to be issued under the modified plan to assenting bondholders, are to be made convertible into the 6 per cent prior preference stock of the company on the basis of par for cash, with adjustment of accrued interest and dividends if and when necessary legislation, stockholders votes, and approval of public authority are obtained. Some 2,000 holders of the bonds had approved the former plan of exchange of $20,000,000 first and refunding mortgage bonds under which bondholders may, if they desire, take one-half their present holdings in cash and the other half in new bonds, and the new plan does not affect these holders who have already assented to the original plan.

MINNEAPOLIS & ST. LOUIS.—*Sale.*—Sale of the Minneapolis & St. Louis scheduled for October 9 was postponed to December 13, due to a lack of bidders.

NEW YORK, NEW HAVEN & HARTFORD.—*R. F. C. Loan.*—This company has applied to the Reconstruction Finance Corporation for an additional loan of $5,000,000 to assist it in paying taxes and instalments on equipment certificates, offering as security the collateral now pledged for $14,399,556 of loans already made.

NEW YORK, ONTARIO & WESTERN.—*Trackage.*—This company has applied to the Interstate Commerce Commission for authority to extend its freight service by operating over a branch track of the Delaware, Lackawanna & Western between Cayuga Junction, Pa., and Pittston, 10.34 miles.

Average Prices of Stocks and of Bonds

	Oct. 15	Last week	Last year
Average price of 20 representative railway stocks..	35.09	34.10	35.92
Average price of 20 representative railway bonds..	71.50	72.20	74.44

Supply Trade

The Colorado Fuel and Iron Company, Denver, Colo., has opened an office at 602 Railway Exchange building, Chicago. **Marcus J. Aurelius** has been appointed district manager.

Samuel P. Goodloe has been appointed representative of the **Union Metal Products Company,** the **Railway Metal Products Company** and the **Standard Railway Equipment Company,** with headquarters at Richmond, Va.

H. D. Richardson has been appointed special sales representative of the **Ralston Steel Car Company,** Columbus, Ohio. Mr. Richardson was a member of the class of 1917, Purdue University, and formerly served with the American Steel Foundries.

The Superheater Company, New York, celebrates this year the 25th anniversary of the manufacture of the first Elesco locomotive steam superheater. Since that time the use of Elesco superheaters has been extended to include marine boilers and stationary boilers for industrial plants. In addition to superheaters, locomotive feedwater heaters, exhaust steam injectors, pyrometers, air preheaters and other heat exchangers are now manufactured.

James L. Wick, Jr., president and general manager, Falcon Bronze Company, Youngstown, Ohio, and a director of the **American Foundrymen's Association,** has been elected vice-president of the association, to fill the vacancy caused by the death of B. H. Johnson. **E. H. Ballard,** General Electric Company, West Lynn, Mass., has been elected to the board of directors to fill the unexpired term of Mr. Wick.

S. H. Flannagan of the Omaha, Neb., office of the **Johns-Manville Sales Corporation,** has been appointed Transportation Department representative with headquarters at St. Paul, Minn. Mr. Flannagan entered the service of Johns-Manville in 1929 in the Chicago district. He was subsequently transferred to the St. Louis district and then to Omaha. Previous to his service with Johns-Manville, Mr. Flannagan had been in the employ of the W. S. Nott Company, Minneapolis, Minn., the West Disinfecting Company and the Garlock Packing Company.

The Republic Steel Corporation, Youngstown, Ohio, has moved its Pittsburgh district sales office from Fourth and Bingham streets to 1832 Oliver building, Pittsburgh, Pa. The **Union Drawn Steel Company,** a Republic subsidiary, has moved into an adjoining suite in the Oliver building.

OBITUARY

Frank J. Johnson, one of the founders of the American Hoist & Derrick Company, died on October 15, at the age of 79.

Alexander S. Henry, vice-president and a director of the American Locomotive Company, who died on October 10, was born in Manchester, England, and came to this country when a young man. Mr. Henry's early experience in the iron and steel business was obtained among the steel mills in the Cleveland district and vicinity, where he served in various capacities, principally in the open hearth departments. He later entered the employ of one of the steel-tired wheel plants in Cleveland, which subsequently became a part of the Steel-Tired Wheel Company, and during its existence he was in charge of the

Alexander S. Henry

local management of a number of its plants. When this company was merged with the Railway Steel-Spring Company in 1902 Mr. Henry went to New York as assistant secretary of the merged company, acting in a supervisory capacity in the selling and operating departments of the steel-tired wheel and the steel tire divisions of the company. In 1910 he was elected a vice-president, at which time he assumed charge of operations of the various plants of the company. In 1920 he was elected a director and a member of the executive committee and in May, 1926, Mr. Henry was elected president of the same company, which at that time became a subsidiary of the American Locomotive Company, and Mr. Henry was elected also a director of the latter company. In June, 1934, the Railway Steel-Spring Company was consolidated with the parent company, operating under the name of the Railway Steel-Spring Division, at which time Mr. Henry was elected a vice-president of the American Locomotive Company, in charge of the Railway Steel-Spring Division.

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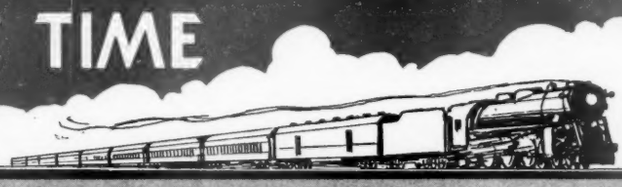
TRAINS ON THE ROAD 25 PER CENT LESS TIME



under C.T.C.

ON a short line, "Union" Centralized Traffic Control has so expedited train movements that trains are on the line 25 per cent less time than when operated under train orders. » »

Under normal operation about ten minutes is saved per train. At times the saving is greater. For example: A northbound extra, running against the schedule of a southbound passenger, did not have time to run to the first station beyond C. T. C. territory and was headed into a siding. While entering the siding, information was received that the passenger would be delayed 30 minutes. The extra was moved through the siding, without stopping, and given clear signals to the end of C.T.C. territory, where orders were received advancing it still further, saving at least one hour's delay.

Those held responsible for keeping trains moving are enthusiastic about "Union" C. T. C. wherever installed. It has improved the service, bettered public relations and reduced the cost of operation.

Ask our nearest District Office for details.

1018

1881 **Union Switch & Signal Co.** 1935

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NEW YORK MONTREAL CHICAGO ST. LOUIS SAN FRANCISCO

Railway Officers

EXECUTIVE

Roy H. MacCready, whose appointment as vice-president of the Bangor & Aroostook, with headquarters at Bangor, Me., was noted in the *Railway Age* of October 5, was born on October 27, 1877, in Kings County, New Brunswick, Canada. Mr. MacCready entered railway service in 1895 with the Intercolonial Railway (Can-

Roy H. MacCready

adian National) and served as telegraph operator. In January, 1897, he entered the service of the Bangor & Aroostook as telegraph operator and has since served consecutively as assistant agent, relief agent, train dispatcher, assistant superintendent, car distributor, chief clerk to vice-president, chief clerk to president, and assistant to president, which position he held until his recent appointment as vice-president.

FINANCIAL, LEGAL AND ACCOUNTING

W. R. Groom, chief special agent of the Western Pacific has been appointed also claim agent, with headquarters as before at San Francisco, Cal., to succeed **L. J. Kerrigan,** who has resigned.

H. B. Harding has been appointed assistant to the real estate and tax commissioner of the Southern Pacific, with headquarters at San Francisco, Cal. Under the direction of the real estate and tax commissioner Mr. Harding will have jurisdiction over all of the company's tax matters.

TRAFFIC

C. A. Pollock, chief clerk to the assistant freight traffic manager of the Union Pacific at Chicago, has been appointed general agent of the freight department at Sioux City, Iowa, succeeding **C. W. Evers,** who has been transferred to Omaha to replace **W. D. Clifton,** deceased. These changes became effective on October 16.

George K. Reeder, general agent on the Missouri-Kansas-Texas at New Orleans, La., has been promoted to assistant general freight agent at Dallas, Tex., to fill a position that has been vacant for several years. **H. A. Carriere,** traveling freight and passenger at New Orleans, has been appointed general agent at that point, to succeed Mr. Reeder.

ENGINEERING AND SIGNALING

H. H. Pevler, division engineer of the St. Louis division of the Pennsylvania, with headquarters at Terre Haute, Ind., has been transferred to the Ft. Wayne division, with headquarters at Ft. Wayne, Ind., succeeding **R. H. Crew,** who has been transferred to the New York division at New York, to replace **J. F. Swenson,** who has been transferred to the Logansport division at Logansport, Ind. Mr. Swenson succeeds **C. O. Long,** who has been transferred to the St. Louis division to replace Mr. Pevler.

PURCHASES AND STORES

E. M. Willis, executive assistant on the Northern Pacific, has been appointed purchasing agent, with headquarters at St. Paul, succeeding **C. C. Kyle,** deceased.

Effective October 21, the purchasing department of the Spokane, Portland & Seattle will be moved from Vancouver, Wash., to Portland, Ore. **G. R. Williams** is purchasing agent.

Samuel P. Warmack, division storekeeper on the Gulf Coast Lines (a unit of the Missouri Pacific Lines), who has been promoted to general storekeeper of the Missouri Pacific Lines in Texas and Louisiana, as noted in the *Railway Age* of September 28, was born on November 25, 1892, at Beaverdale, Ga. Mr. Warmack entered railway service on October

Samuel P. Warmack

1, 1912, with the San Antonio, Uvalde & Gulf (also a unit of the Missouri Pacific Lines) and after three years with this company he went with the El Paso Electric Railway Company. On August 16, 1916, he entered the service of the International Great Northern, where he served in the mechanical department at Taylor, Tex., until April 26, 1917, when he was transferred to the store department with the same headquarters. On February 4, 1920, Mr. Warmack was promoted to division storekeeper of the Fort Worth division, at Mart, Tex., and on May 10, 1923, he was appointed general foreman for stores, with headquarters at Palestine, Tex. On June 1, 1924, he returned to Taylor as storekeeper and in May, 1926, he was appointed joint storekeeper for the Houston Belt & Terminal and the International Great Northern, with headquarters at Houston, Tex. On February 15, 1928, Mr. Warmack was promoted to division storekeeper of the St. Louis, Brownsville & Mexico (another unit of the Missouri Pacific Lines), with headquarters at Kingsville, Tex., which position he held until his recent promotion to general storekeeper.

OBITUARY

L. B. Banks, general agent for the Southern Pacific at St. Louis, Mo., died on September 29.

E. W. Gates, assistant secretary of the Ashley, Drew & Northern, with headquarters at Crossett, Ark., died on October 6.

Michael J. McGraw, who retired about four years ago as a master mechanic on the Seaboard Air Line, died at his home at Chicago on October 9.

William W. Baum, assistant traffic manager of the Litchfield & Madison, with headquarters at Chicago, died suddenly at that city on October 8.

Pitt P. Hand, who retired in March, 1928, as publicity manager of the New York Central at New York, died on October 12 at Washington, D. C.

James E. Baldwin, former auditor of disbursements of the New York, New Haven & Hartford, with headquarters at New Haven, Conn., died in that city on October 7, after an illness of a year and a half. Mr. Baldwin retired in 1930.

George B. Ecker, retired general passenger agent of the Atlantic Coast Line, died at his home in Jacksonville, Fla., on October 9. Mr. Ecker was 70 years old and had been connected with this road for 45 years. He retired in October, 1933, because of ill health.

Roland P. Eubank, general real estate agent of the Chesapeake & Ohio, with headquarters at Huntington, W. Va., died of heart disease on October 14 at Richmond, Va. Mr. Eubank was born on November 14, 1880, in King William county, Va., and attended Virginia Polytechnic Institute. He entered railway service in October, 1905, as rodman for the Carolina, Clinchfield & Ohio (now Clinchfield), later becoming assistant engineer. In December, 1909, he became assistant engineer in the construction and real estate department of the Chesapeake & Ohio, and in February, 1916, he was appointed assistant real estate agent. Mr. Eubank was promoted to real estate agent in March, 1920, and general real estate agent in April, 1927.